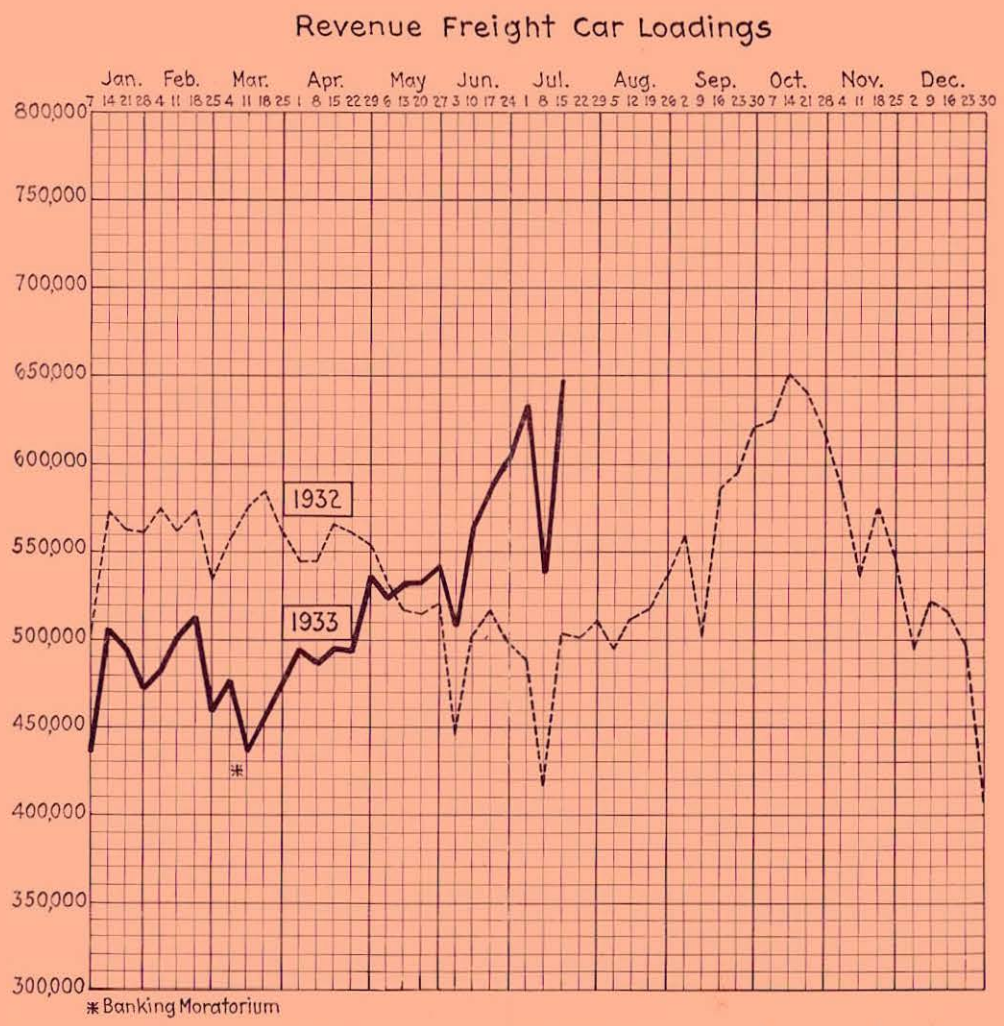
JULY 29, 1933

Railway Age

FOUNDED IN 1856

Freight Car Loadings Make New 1933 High



For purpose of comparison holidays are arranged to fall into corresponding weeks in each year

Car loadings for the week ended July 15 set a new high record for 1933, totaling 648,206 cars, and with the exception of the week of October 15, 1932, were the heaviest since November, 1931.

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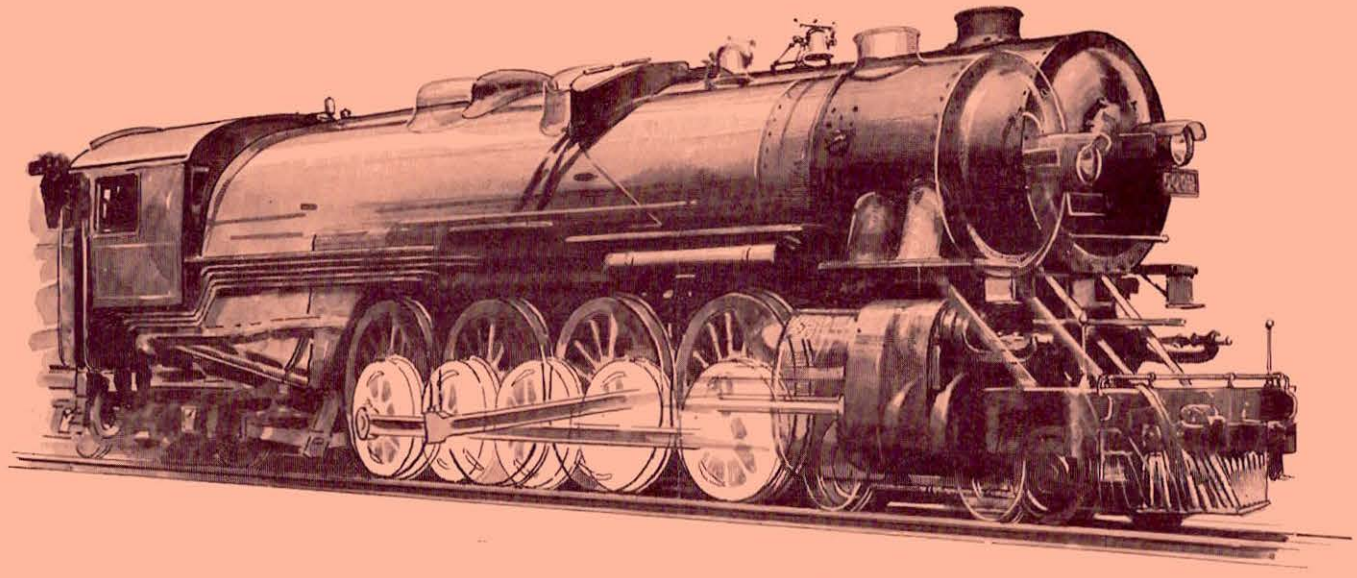
a merger



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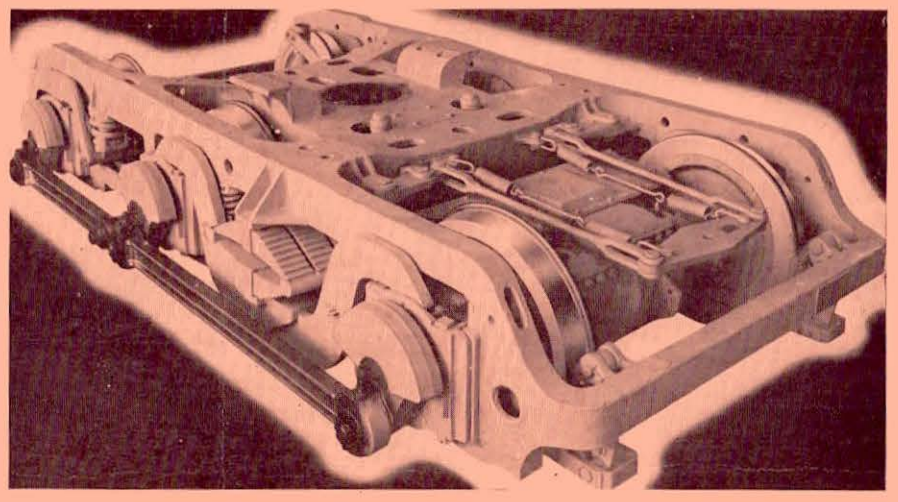
Here is where the Bethlehem Auxiliary Locomotive comes in.



The Auxiliary is to the high-wheel engine what the low gear is to an automobile. The 10,000 to 18,000 pounds of additional tractive force which it instantly provides puts this class of engine on a par with the low-wheel engine as regards tractive characteristics.

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BETHLEHEM AUXILIARY LOCOMOTIVE

BETHLEHEM STEEL

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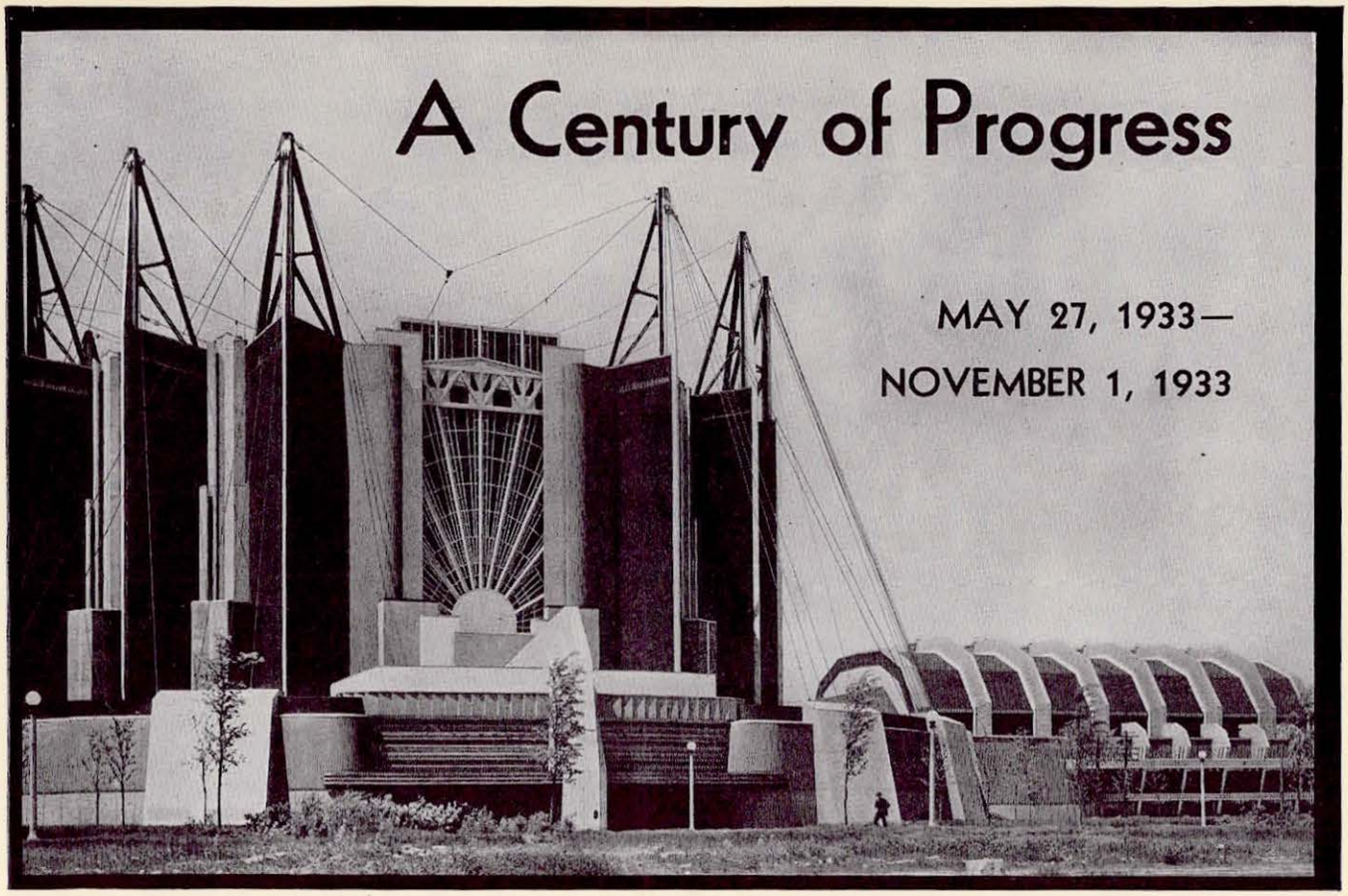

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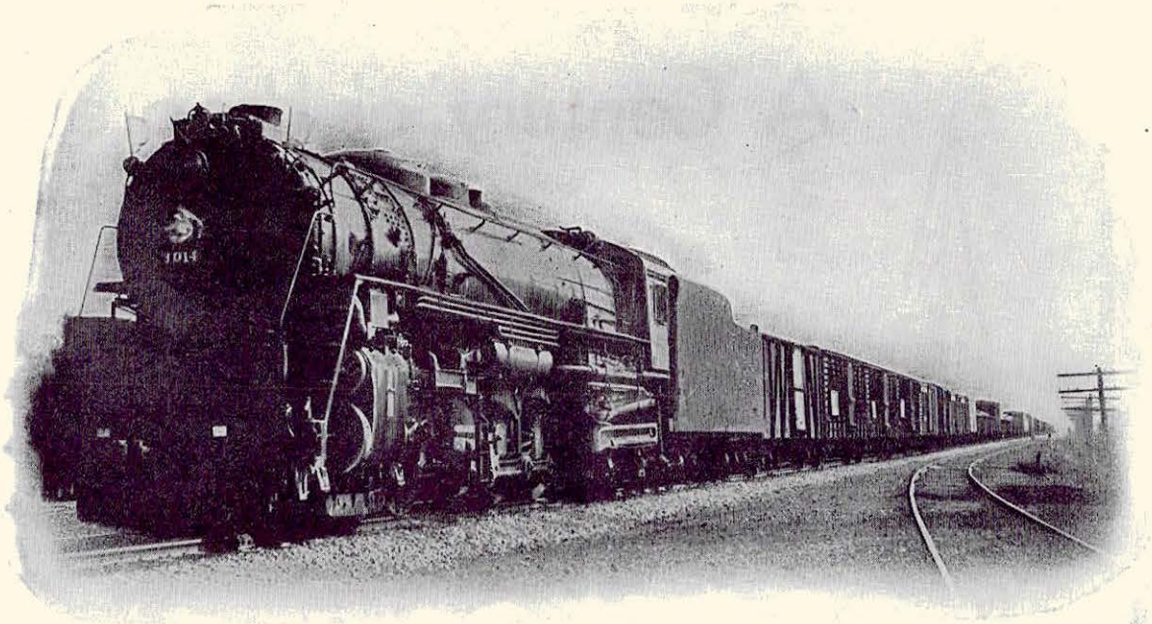

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With which are incorporated the Railway Review, the Railroad Gazette and the Railway Age-Gazette. Name registered U. S. Patent Office.

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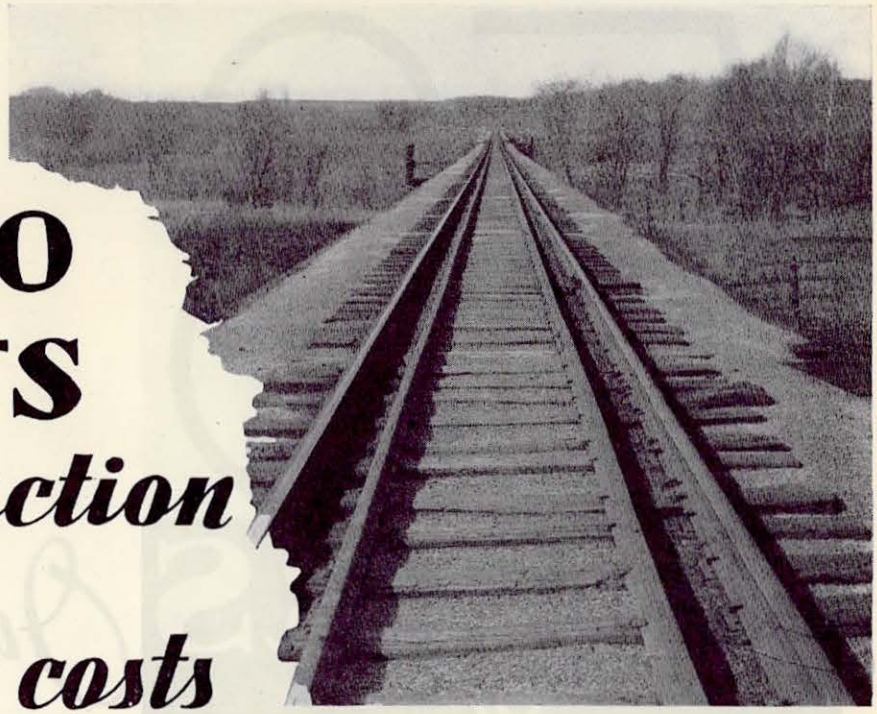

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RAILWAY AGE

The Proposed Transportation Conference

A number of developments which have occurred within recent months have substantially changed the transportation situation in the United States. The increase in freight car loadings, which in the three weeks ended July 15 exceeded loadings in the corresponding weeks of 1932 by 29 per cent, has greatly improved the gross and net earnings of the railways. The measure creating a federal co-ordinator of transportation, whose duties include recommending to Congress legislation regarding the entire transportation problem, has improved the prospect of government action to equalize the terms of competition between carriers by railroad, by water and by highway. The industrial recovery legislation, requiring industries to adopt codes pertaining to competition and wages and working conditions of employees, promises to eliminate some of the "wild-cat" methods and sweat shop conditions of employment prevailing in highway transportation.

Influenced, no doubt, largely by these developments, the Railway Business Association, the principal organization of the manufacturers of railway equipment and supplies, has initiated a movement for a transportation conference to be participated in by representatives of the various classes of carriers and by shippers and other business men, which would afford them an opportunity to "endeavor to co-ordinate their thinking and unify their conclusions for submission to the public and for such influence as they might possess in aiding Congress to formulate a constructive and all-inclusive program of transportation legislation."

Sentiment for Stabilizing Transportation

While General Hugh Johnson, administrator of the Industrial Recovery Act, is being called by some the "taskmaster of industry," he declares it is one of the main purposes of this act to give opportunity for self-regulation of business. In a vital sense all the means of transportation constitute a single industry. In large measure they are competing for the same traffic; and it is to the interest of the public and of a large majority of investors and workers who are directly and indirectly dependent upon the earnings of transportation companies that their competition shall be stabilized on a fair basis. Such stabilization would involve the elimination of subsidies, the application of comparable regulation of rates and service, and the establishment of similar wages and working conditions for employees. Any carrier or group of carriers that could not meet competition under such a policy of stabilization is parasitic and has no economic justification for its existence.

The railways are not the only branch of the transportation industry that wants that industry stabilized on a sound basis. Coastwise steamship lines favor regulation that would protect them from "fly-by-night" competitors who make it impossible for them to maintain remunerative rates. Operators of motor truck lines giving regular service favor establishment of a code providing for the publication and maintenance of rates and the fixing of more reasonable wages and working hours, to protect both them and their employees from "wild-cat" truckers who demoralize transportation by highway as well as by rail. Most shippers and business men want motor transport put on a sound economic basis because they want their competitors to pay the same freight rates that they do and to see eliminated truckers who demoralize markets not only by making secret and discriminatory rates, but by buying and selling commodities in competition with established dealers.

Can Transportation Interests Agree?

It is to be hoped that all business interests that are especially affected by present conditions in transportation, and that will be especially affected by the new transportation legislation which probably will be passed by Congress at its next session, will participate in the proposed transportation conference. The interests of shippers, of the different classes of carriers, of manufacturers of railway equipment and supplies and of motor trucks, and of the employees of these transportation agencies and manufacturers seem to be conflicting. Consequently their representatives probably would not be able to agree regarding all of the provisions of the transportation legislation that should be enacted.

That legislation will be enacted is almost certain, however, and conceivably many of the provisions it should contain might be agreed upon, in principle at least, in such a conference as is proposed. If no agreement regarding any parts of it is reached by those most directly interested, government officials and members of Congress will be bombarded with propaganda and counter-propaganda consisting largely of criticism of the conduct of every branch of the transportation industry, and this is more likely to cause stringent government control of the entire industry than to increase that self-regulation of it which Gen. Johnson says he favors for all industries. As the railways already are the most government-regulated of all industries, they have less reason to fear such an outcome than any other branch of the transportation industry. At the same time, it does the railways no good to have continued a warfare between them and other interests in which there are constantly broadcast by spokesmen of the oil and truck manufacturing industries charges that the troubles of the railways are due to senile unprogressiveness of their managements and to inability on their part to meet new competition.

Effects of Continued Warfare

Those interested in other forms of transportation may well ask themselves whether, in trying to maintain unfair conditions of competition, and in defending them by some of the kinds of lobbying and propaganda they are using, they are not making mistakes similar to those made by the railways a good many years ago when they persisted in distributing passes wholesale among legislators and in giving rebates and practicing other forms of unfair discrimination, in spite of a rising tide of public sentiment against them. The result was legislation not only to suppress the real abuses complained of, but to impose handicaps and restrictions from which the railways have suffered severely ever since.

State legislation already enacted shows that motor trucks are not so popular with other highway users and the taxpayers that their manufacturers and operators can reasonably hope to enjoy such governmental favoritism in future as they have in the past. Furthermore, the managements of the railways are actually among the best friends of the motor manufacturers because they desire to increase the use of trucks and busses of reasonable weights and size in co-ordination with their rail service, and therefore are less disposed than some other interests to favor unfair handicapping of motor transport. At the same time, they are strongly opposed to a continuance of the "wild-cat" trucking which makes it impossible to pay reasonable wages or charge reasonable rates in the trucking business, regardless of who operates the trucks, and which undermines reasonable railway rates and earnings. It is significant that independent operators of motor truck lines are beginning to accept, in large measure, the views of railway managers regarding the need of stabilizing motor transport and its relations with the railways, and to join railway managers in criticizing motor truck manufacturers for persisting in promoting "wild-cat" trucking.

We believe the time has almost come when most of those who have the most direct and greatest interest in the welfare of the transportation industry as a whole can agree upon many of the practices and policies which should be adopted to stabilize it and put all branches of it on a more prosperous basis. Therefore, the proposed transportation conference, if participated in by representatives of most or all of the groups most directly affected by conditions in the transportation industry, and by the results of its operations, might help to cause constructive developments which would be beneficial both to the various branches of the transportation industry and to the public.

Will Recovery Act Aid Transport Stabilization?

Motor truck and motor bus operators are organizing to bring themselves under the provisions of the Industrial Recovery Act. To the extent that this holds promise of stabilizing highway transport it is good news, not only for the railways and railway employees but for the legitimate highway operators as well—since all of them have lost heavily from the inroads of "wildcat" highway transport with no standards of fair competition or employment.

As for the effectiveness of the proposed organizations—whether they will actually accomplish stabilization or not—only time can tell. Probably the answer lies largely in the extent to which the trade associations are controlled by legitimate operators rather than by manufacturers of commercial vehicles, whose concern is primarily the sale of the greatest possible volume of their products. Heretofore, many so-called motor truck associations have opposed any form of regulation for this form of transportation, whereas, apparently, the bulk of the responsible operators desire it, in some degree at least, as a protection from cut-throat competition. Certain it is that most operators of motor vehicles can never make any money as long as such competition is permitted.

Upon what basis can motor transportation be stabilized? Obviously, there are two divisions into which the industry falls—one being that of collection and delivery (of passengers or freight) in local zones, and the other being transportation over the highway between communities. The character of these operations—local on the one hand, and long-distance on the other—differs so greatly that it would appear to be almost impossible to deal with them in one code of fair practices. Local bus operations are already generally stabilized with charges fixed by regulation. Local truck transportation is, aside from drayage, to a large degree confined to operators transporting their own products. Many of them use their vehicles only casually and their

principal business is farming or merchandising rather than transportation. It would seem that very little in the way of additional stabilization is needed as far as local motor transport is concerned.

It is in the long-haul traffic, particularly where there is no regulation, that cut-throat competition, low wages, long hours and attendant evils have arisen, and where corrective measures should be applied. The first of these measures obviously should be to put an end to sweat-shop conditions of employment. Could there be any fairer method for ending such conditions in the transportation industry than by applying, in so far as practicable, somewhat the same standards which apply to railway labor?

This suggestion is not original with us, nor does it come from any railroad source. Charles E. Cotterill, general counsel of the American Highway Freight Association, appearing before the House Committee on Interstate and Foreign Commerce, described the working conditions of motor transport as "deplorable" and suggested that motor transport labor be brought under the provisions of the Railway Labor Act. The tentative codes for motor transport so far made public, however, provide for labor conditions and wages far lower than those obtaining on the railways for similar classes of work. That proposed by the bus operators, for example, calls for a $15 minimum weekly wage and a 54-hour week—not a maximum week of this number of working hours, but an average of that number. By contrast, passenger trainmen and enginemen on the payrolls of the railroads in April of this year worked an average of 106 hours during the month (exclusive of overtime), for which their compensation averaged $166. The lowest paid group among such employees, passenger flagmen, in the month worked an average of 130 hours straight time, for which their compensation averaged $123. Thus the proposed minimum wage for bus drivers is set at less than 28 cents an hour, while the average pay of railroad passenger transportation employees in April was approximately $1.50 an hour and that of the lowest paid group among them was almost 95 cents.

The Railway Labor Act does not in itself set any fixed standards of pay or working conditions. Rather it provides an elaborate machinery for negotiation which protects employees in any effort which they may make to secure improved conditions of employment. It would take time for such an act materially to ameliorate conditions in motor transport. That would not preclude, however, the adoption in a code of fair practices for all forms of transportation, of wage bases and conditions of employment similar to those in effect on the railroads. The basic day of freight trainmen and enginemen is eight hours of duty or 100 miles run; the basic day of passenger trainmen is eight hours or 150 miles. Since, usually, trains run much further than 100 miles (in freight service) or 150 miles (in passenger service) in eight hours, the result is that the basic day's pay is usually earned in much less than eight hours. It is very questionable if, under present conditions, this basis is fair to the railroads, but if it is fair to the railroads, it should serve as a fair standard for other forms of transportation.

It would appear that if railway employees are not to be discriminated against by the employment of underpaid labor in a competing branch of transportation, the pay per mile of bus and truck drivers ought not to be much lower than the average per mile of train service employees. Overtime pay at penalty rates is provided for in train service on the railways. Its application to highway transportation would greatly improve working conditions in that business.

Most of the railroads have agreements with the transportation brotherhoods requiring that employees be not kept for long periods away from the home terminal. The practice of running a train a thousand miles with the same crew is not followed on the railroads. They end their work not more than one day's journey from the home terminal. A similar practice in the case of truck transportation would not only enable drivers to be more often with their families, but would mean that they would become minutely acquainted with their routes and could thus drive more safely than is now possible in unfamiliar territory. Laws regarding hours of rest for transportation employees on the railroads set standards which would add greatly to the safety of motor transport as well as to the well-being of drivers.

The matter of codes of fair practices and working conditions provided for in the Industrial Recovery Act is not the concern alone of the industry formulating them. They must first be passed upon by the industrial recovery administrator and thus they become a part of the policy of the government. What is the policy of the government toward labor in the transportation industry? As it has manifested itself so far on the subject of wages, its policy is that, at least for the time being, they should be no lower than those now paid on the railways. Railway managements recently proposed a reduction, but the government took the stand that, in view of the rising price level and the program for industrial recovery, such action should not be taken. Having taken that view of wages in one branch of the transportation industry, the government could not with any consistency approve a code in another branch of the same industry which was less favorable to labor and would have a deflationary tendency throughout the industry. What holds true of the railroads and highway transportation is equally true of the inland waterways, namely, that comparable wages and working conditions should be enforced, unless it is the government's desire to deflate transportation and its employees at a time when it is inflating everything else.

The *Railway Age* has at times been accused of favoring low wages. Speaking generally, the exact opposite is our policy. But wages, like commodity prices, cannot be discussed alone. They must be considered in their relationship to each other. If commodity prices rise too high in relation to wages, purchasing power declines and business stagnates. On the other hand,

if the wages in any particular industry become artificially high with reference to commodity prices, then the costs in that industry are held at too high a level, and the public withdraws its patronage. Similarly, if wages in one branch of an industry are high and those of another branch are low, the high-wage branch will lose business to the low-wage branch. That, we believe, explains to an important degree the loss of traffic by the railways to other forms of transportation. The decline in patronage throws employees out of work, impoverishes security owners and injures business generally. The *Railway Age* advocated a reduction in railway wages only to bring railway costs into line with commodity prices and to restore in some measure railway credit and employment. If the relationship between wages and prices can be restored by raising prices, as is apparently the desire and hope of the government, rather than by reducing wages, the same effect will be attained. Similarly equalization of labor costs must somehow be secured in the entire transport industry if traffic and employment are not to be artificially diverted from railways to their competitors.

Will History Repeat Itself?

The railways have been very largely out of the crosstie market for three years. As a result, their replacements are now estimated to be at least 75,000,000 in arrears. This is more than a year's normal renewals. And this deficiency is still mounting, for the renewals this year to date (and the season for renewals is now half gone) is at a lower rate than in any of the recent years of subnormal maintenance. Furthermore, a large part of the renewals that have been made of late, and that are still being made, are being drawn from stocks on hand, with the result that railway tie inventories are greatly subnormal, while purchases have been reduced to an even lower level than the renewals might indicate. As a result, the commercial tie producers have feared to build up or even to maintain their inventories, and their stocks available to fill orders, as shown by statistics compiled by the Railway Tie Association, have declined steadily until they now total less than a two-week's supply in an active renewal season.

Even more serious is the fact that the producers have, of necessity, largely disbanded their producing organizations, with the result that considerable time must necessarily elapse after a demand materializes before any considerable output can be secured. This is due to the manner in which ties are produced. Unlike a mill or a factory which can be placed in production on short notice, the typical tie-producing organization commonly consists of a number of individual woodsmen-farmers who cut and bring ties out to a railroad siding for sale to a tie company. With high prices for cotton, with support from public relief funds, etc., it is the common expectation of experienced tie producing companies that these woodsmen will show less than normal interest in the cutting of ties this year and that it will be more than usually difficult to stimulate production.

What will be the effect of this situation on the railways? In the first place, it will extend the period between the time when the railways decide to enter the market and the time when they can secure ties for use —a period that under normal conditions requires from six to nine months or longer for proper production, seasoning and treatment. Another possible result that not a few experienced operators are fearing is a runaway market, with standards thrown to the winds. That this is no imaginary fear is shown by experience in every previous return of the railways to the market after a protracted absence.

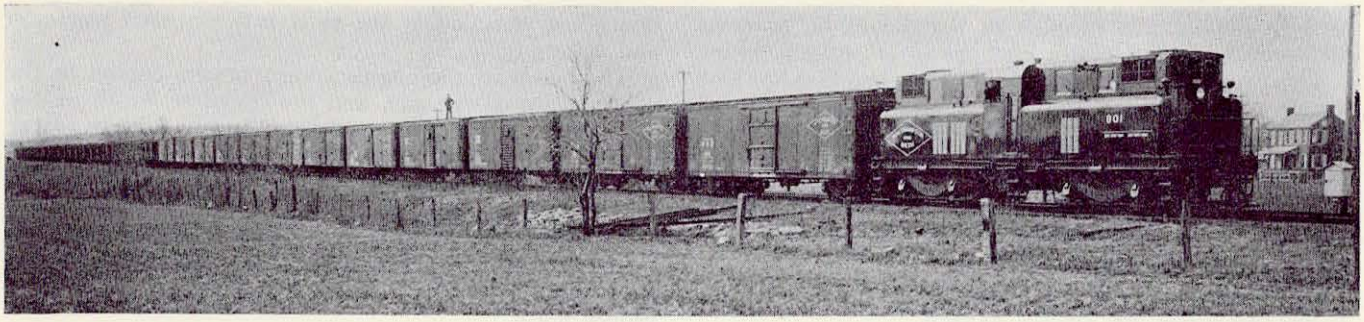
The railways are now getting better ties than ever before. This is in part a reflection of the limited demand and the ability to choose the best. It is even more the result of 15 years of insistence by the railroads and certain producers alike on the economy of well-made, well-treated and well-seasoned ties, until the appreciation of these standards is well nigh universal today.

Will these standards be maintained when the railways return to the market? Will the railroads have the courage to present a stern front, in the face of pressing demands, on the one hand, and of delayed production, on the other, against attempts to relax the prohibition against even a limited amount of decay—will they tolerate scant dimensions—will they condone incomplete seasoning—in an effort to get ties which they sorely need?

The roads are approaching the most severe test of their ability to support the specifications built up for their protection that they have yet experienced. It is to be hoped that they will recognize the necessity of presenting a united front and thereby holding the ground that they have gained during the last decade and a half. The best way to do this is to recognize the time interval necessary in meeting their tie requirements and anticipate their needs as far as possible in order to permit orderly production. Where this is impossible, the next best measure is to recognize the time interval that is necessary for the production and treatment of sound ties and to insist that this interval be not scaled down. Upon those officers responsible for the selection, purchase and use of crossties now rests the responsibility of insuring that their managements understand this situation in order that they may not later expect the impossible and, in attempting to attain it, lower their standards.

Indexes to Volume 94

The indexes to the latest volume of the *Railway Age*, January to June, 1933, are now ready for distribution. Subscribers who desire copies should advise the New York office, 30 Church street.



The Northampton & Bath Locomotive at Work

Westinghouse Diesel Locomotive Operated by Northampton & Bath

Two engine-generator units develop 800-hp. in a 110-ton locomotive

By T. H. Murphy,
Railway Engineer, Westinghouse Electric & Manufacturing Company

AN engineering analysis was begun early in 1932 of the motive power on the Northampton & Bath Railroad, Northampton, Pa., with the object of determining the most economical type that could be used. The study was all inclusive, embracing locomotives powered with various types of internal combustion engines, such as the Diesel-electric, gas-electric, engine-battery, distillate and butane burning, and likewise various types and sizes of steam locomotives suitable for present and future operations.

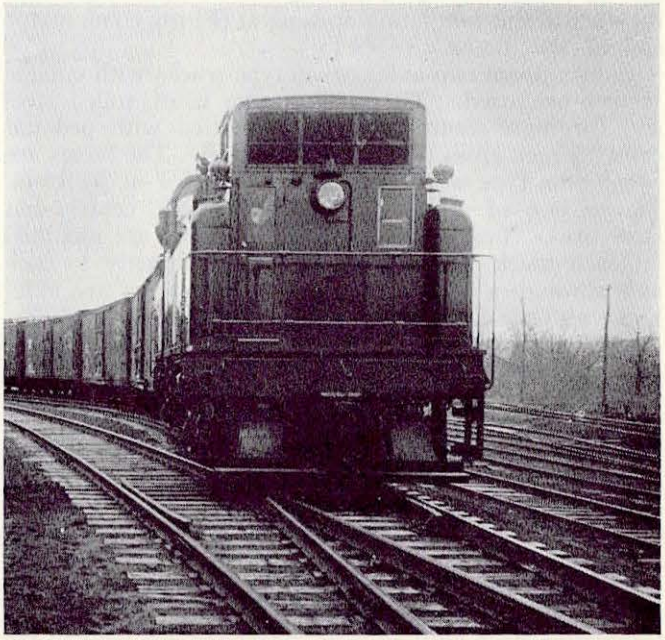
The study indicated that the 110-ton, 800-hp. Diesel-electric would give the required tractive force and speed for all operations, and additions of similar locomotives would allow for contemplated replacements of all the several types of steam locomotives now in use. Further, all cost estimates indicated the Diesel would give the lowest operating costs and that savings would justify the investment in this new type of locomotive. As a result, it was decided to place a Diesel locomotive on test for 90 days and by careful observation, determine the correctness of the analysis.

A locomotive was placed in service on October 15, 1932, and the test continued until January 15, 1933. All the data in the initial studies were substantiated and the locomotive has been purchased for regular operation.

The new locomotive is powered with two 400-hp. Diesel engines. The engine-generator units are mounted one over each truck with a spacious engine room around each. The operator's cab is located between the engine compartments in the center of the locomotive. The cab floor is raised slightly above the engine-room floor to give added visibility. The center cab enhances the attractiveness of the locomotive in addition to giving excellent visibility in either direction. Two conventional swivel trucks are used.

The locomotive is arranged particularly to give good visibility in order to make one-man operation safe and practical. The sides of the hoods over the engines are set back slightly at the top portion to allow visibility along the train. The engineman is at a height that will permit him to observe all ground-crew movements and signals, and receive signals from along the top of his train. Further, control stands are located on both sides of the cab so that the operator can govern the locomotive movement from either side with equal facility. All levers of the two control stands are connected together mechanically so that the operator can cross over at any time and continue operation uninterrupted on the opposite side.

Maintenance facilities on a railroad such as the Northampton & Bath do not include the large forces and heavy equipment found on larger roads. Particular care was



The Operator Has a Good View from the Cab

used in obtaining a locomotive that could be properly maintained without major changes in existing facilities.

The two 400-hp. engines rather than one 800-hp. lend themselves readily to the scheme of operations as all parts are sufficiently small to be serviced without heavy shop equipment. Aisles are provided on all sides of the engine-generator units that permit servicing of all parts. Overhead clearance permits removal of heads, pistons and other parts. The electrical contactors, battery, and other items are all cabinet-mounted and readily accessible.

General Data and Dimensions of Northampton & Bath 800-Hp. Diesel-Electric Switcher

Builder	Westinghouse Elec. & Mfg. Co.
Mechanical parts by	Baldwin Locomotive Works
Service	Switching and heavy transfer
Weight	220,000 lb.
Tractive force starting, 30% adhesion	66,000 lb.
Tractive force, continuous	23,000 lb.
Speed at continuous tractive force	10.2 m.p.h.
Maximum safe speed	45 m.p.h.
Minimum radius of curvature:	
Alone	100 ft.
With load	175 ft.
Length overall coupler knuckles	47 ft. 8 in.
Width overall	10 ft. 7 in.
Height overall	14 ft. 8 in.
Wheel base, total	33 ft. 10 in.
Wheel base, rigid	8 ft. 6 in.
Engines (2)	Westinghouse, 6-cyl. Diesel, 9 in. by 12 in., 400 hp., 900 r.p.m.
Motors (4)	Westinghouse, 360 type, 320 hp. at 600 volts
Battery	32 cells, 204 amp.-hr.

Mechanical Parts

The underframe is a built-up deck with center and side sills of structural steel braced with cross ties and bolsters. Longitudinal channels are used to withstand the large bumping strains encountered on a switching locomotive. Lifting lugs are located near the ends of the underframe. The bumpers at each end of the locomotive are of steel plate and cast steel.

Draft gear is provided at each end, securely held by steel castings. Miner draft gear, type A79X and A.R.A. Type D long shank 6-in. by 8-in. couplers are used.

The traction motors are force-ventilated by two motor-driven fans mounted under the locomotive between the trucks. Each blower furnishes air to a pair of motors on one truck. The air ducts are built in the underframe and air passes through a flexible bellows connection from the duct to the ventilating opening at the top commutator end of the motor.

Conventional two-axle, swivel type trucks with outside frames are used. The truck frame is of rolled steel and forgings, securely braced and fitted with pedestal caps. Truck cross ties are of cast steel. The boxes are Symington type with bronze bearings. A 7-in. by 13-in. journal is used. The wheels have cast steel centers and steel tires. Two standard traction motors are mounted on each truck. One motor is geared directly to each axle through a pinion and gear. The motors are axle-hung with the nose resting on the transom.

Westinghouse air brake equipment, schedule 14-EL with straight and automatic air, is used. The air brakes on all the wheels give a braking effort of approximately 85 per cent at 50 lb. per sq. in. cylinder pressure. The brake cylinders are located on each truck which insures positive functioning with a minimum of levers.

The engineman's compartment is located at the center of the locomotive between the two engine rooms, from which it is separated by partitions. The floor is above the general level of the locomotive underframe. Ladders extend from the operator's floor level to the general locomotive floor level at each end of the cab next to the engine rooms. Doors lead to the outside of the cab and doors are provided at the ends between each platform and engine room.

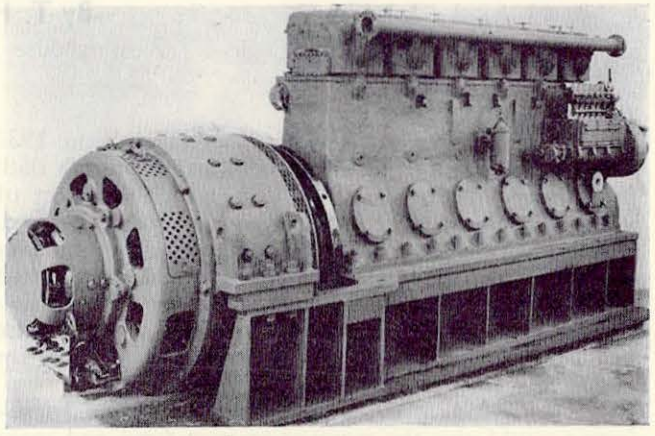
The hoods of the engine compartments extend to the same height as the cab, and the complete width of the locomotive. They form a "room" around each power plant with space for all inspections and repairs.

The superstructure is a riveted construction of steel plate and structural steel. Metal window sashes and frames are used throughout. All windows of the operator's cab have plate glass. Cork dashing is used in the cab to eliminate "sweating" of the metal and to reduce noise.

Engines and Electrical Apparatus

The engines are the four-cycle solid-injection Diesel type and each has six cylinders. Their rated speed is 900 r.p.m. The total 800 engine horsepower is necessary to meet the speed and load requirements of the heavy haulage of the N. & B. Normally each engine-generator set furnishes power to two electric traction motors but for emergency operation or light switching all four traction motors can be connected to one power plant.

The construction embodies a welded steel bedplate on which the engine and generator are directly mounted. Each bedplate is bolted solidly to the underframe of the locomotive. Lubricating oil sufficient for several weeks' operation is stored in the bedplate. Provision is made for taking either power plant from the locomotive by removing the end sheet of the hood. The flywheel of the engine is bolted solidly to a flange of the generator shaft.



The Engine-Generator Set

The engines have individual light-weight cylinder heads with dual valves. They can be handled without shop tool equipment. Aluminum pistons are used. The liners are removable. The main and connecting-rod bearings are of the shell type which permits unit replacement. The unit assembly and light weight of these parts and such things as the gears, water pump and fuel pump, have fitted in nicely with all existing maintenance facilities of the N. & B.

The electrical rotating apparatus is of conventional railway design. The generators and traction motors have class B insulation. The generator has a grease-lubricated, single anti-friction bearing. The traction motors have sealed-sleeve bronze bearings so that frequent attention to these parts is not necessary.

Electro-pneumatic contactors are used in all the main power circuits and magnetic contactors in the control and auxiliary power circuits. Unit replacement of these parts is easily made. All such apparatus is cabinet mounted and serviced from the engine rooms.

The control levers are a minimum to simplify the

duties of the engineer. One lever is used for connecting the motors in series or parallel to the generator and governing the engine speed. This places the complete speed performance of the locomotive under control of one lever. A separate lever reverses the direction of operation. A conventional brake valve is used with straight and automatic air. About eight different operators handle this locomotive in the course of a week, and the simple control made their training an easy task.

A torque control system of loading is used which gives a uniform and complete loading of the engines at all locomotive speeds within the capacity of the electrical apparatus. This is particularly valuable as operation at times is up a 1.8 per cent grade with a trailing load of 800 to 1,000 tons, and maximum power is desired at the rails under such conditions.

Auxiliary Equipment

The locomotive has individual radiators for each engine mounted at each end at the top of the hood. The high mounting causes the water to drain to tanks within the locomotive when the engines are shut down. A stove under the cab floor heats the whole interior of the locomotive during shut-down periods, and prevents freezing. The importance of this feature can be recognized when the fact that the locomotive is never under shelter on the N. & B. is considered. The lubricating oil as well as the water is passed through radiators which are forced-blown by overhead motor-driven fans.

A storage battery is used for engine starting and all control circuits. This battery is kept charged by the main generator when the engines are idling, and by the auxiliary generators when they are up to speed. These two sources of power for battery charging have given every satisfaction and provided a fully charged battery at all times, even though operation is a mixture of light and heavy switching interspersed with heavy transfer haulage. The battery is housed in steel cabinets built under the hoods and is serviced from the engine room. The cells can be removed through the side sheet which has a removable section.

Low voltage compressors are used which operate at all times from the same circuit as the battery. This has given full air whenever needed without the necessity of running the engines above idling speed with the locomotive at standstill. The N. & B. service includes haulage with a coupled train line and under such conditions full air capacity is needed to reduce the delay time to a minimum. Further, operation is over severe grades where air failure would be serious. The arrangement for air supply on the locomotive has proved very satisfactory under the arduous service conditions.

Other features of the locomotive are switchman's step lights for night operation, interior mounted fuel tanks, dual engine gages and electric meters, centrifuges for cleaning the lubricating oil, and screens and filters for the fuel oil.

THE BOARD OF PUBLIC UTILITY COMMISSIONERS OF NEW JERSEY, in a recent decision, granted the application of the Pennsylvania for permission to discontinue arrangements for bus service between New Brunswick, N. J., and East Millstone. Train service on the line had been discontinued in May, 1930, when the P. R. R. entered a contract with a bus operator for a substitute highway service. Subsequently, on January 1, 1932, this train-connection arrangement was supplanted by a plan whereby holders of P. R. R. tickets between New Brunswick and East Millstone were handled on regularly-scheduled bus trips. The P. R. R. found, however, that its revenues from the New Brunswick-East Millstone business amounted to $10.40 per month whereas the cost of arranging for the bus service was $25 per month.

Freight Car Loading

WASHINGTON, D. C.

REVENUE freight car loading in the week ended July 15 totaled 648,206 cars, an increase of 108,983 cars as compared with the preceding week, which included the Fourth of July holiday, and also an increase of 144,445 cars as compared with the corresponding week of last year. This was a reduction of 109,783 cars as compared with the corresponding week of 1931. As a result of recent increases the cumulative loading for the year to date is now only 3.6 per cent less than that for the corresponding period of last year. Loading of all commodities showed increases for the week of July 15 as compared with the week before, and all except livestock showed increases as compared with last year. Forest products, coal and coke showed increases as compared with 1931. The summary, as compiled by the Car Service Division of the American Railway Association, follows:

Revenue Freight Car Loading

Week Ended Saturday, July 15, 1933

Districts	1933	1932	1931
Eastern	147,002	110,870	165,172
Allegheny	132,573	95,605	147,132
Pocahontas	49,057	29,895	47,002
Southern	89,340	71,043	103,413
Northwestern	89,152	61,281	107,104
Central Western	89,969	89,985	123,830
Southwestern	51,113	45,082	64,336
Total Western Districts	230,234	196,348	295,270
Total All Roads	648,206	503,761	757,989
Commodities			
Grain and Grain Products	51,389	42,227	60,824
Live Stock	15,537	16,618	19,594
Coal	113,438	70,214	108,972
Coke	6,316	2,579	4,548
Forest Products	28,075	14,930	27,742
Ore	23,620	6,539	36,900
Merchandise L. C. L.	170,666	166,935	215,539
Miscellaneous	239,165	183,719	283,870
July 15	648,206	503,761	757,989
July 8	539,223	415,928	762,444
July 1	634,074	488,281	667,630
June 24	604,668	498,993	759,363
June 17	587,931	518,398	739,094
Cumulative total, 28 weeks	14,429,147	15,027,509	20,540,918

As a result of the increased car loading in recent weeks the freight car surplus is melting away rapidly. For the last half of June it averaged 453,541 cars, a decrease of 69,244 cars as compared with the first half of the month. The total included 242,326 box cars, 147,652 coal cars, 29,425 stock cars and 11,727 refrigerator cars.

Car Loading in Canada

Car loadings in Canada for the week ended July 15 totaled 39,843, an increase of 2,108 over the similar week of 1932. This was 626 cars less than for the previous week, but the index number rose from 64.18 to 65.44.

	Total Cars Loaded	Total Cars Rec'd from Connections
Total for Canada:		
July 15, 1933	39,843	19,500
July 8, 1933	40,469	19,368
July 1, 1933	35,289	20,673
July 16, 1932	37,735	15,835
Cumulative Totals for Canada:		
July 15, 1933	981,177	499,200
July 16, 1932	1,153,634	558,620
July 11, 1931	1,350,431	758,804

Grade Separation Eliminates Many Multiple-Track Crossings

Four railroads join in the construction of two long underpasses at Black Rock, N. Y.

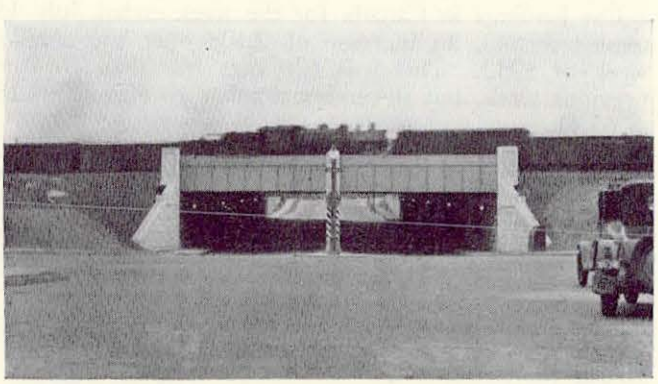
ONE of the largest yard-street grade separation projects that has been completed recently, involving factors somewhat different from those encountered in ordinary main line separations, is at Black Rock, N. Y., where two streets were carried beneath a wide expanse of elevated main, interchange and yard tracks of the New York Central, the Erie, the Canadian National and the Delaware, Lackawanna & Western. The most interesting features in connection with the two crossing separations, one of which involved an underpass 465 ft. long beneath 28 tracks, and the other an underpass 335 ft. long beneath 13 tracks, were the complications introduced by traffic and the difficulties encountered at one of the streets in overcoming unstable foundation conditions.

Tracks Raised Seven to Eight Feet

The tracks at Black Rock lie in a general north and south direction, and, prior to the separation work, were crossed at grade by five through cross streets, as well as partially by several diagonal intersecting streets. The cross streets were, from south to north, Dearborn, Parish, Amherst, Tonawanda and Austin streets. Since these streets were joined by main thoroughfares near the railroad property, it was arranged to close the crossings at Dearborn, Parish and Tonawanda streets and to separate grades only at Amherst and Austin streets, approximately ¼ mile apart and otherwise so located as to afford the greatest convenience through grade separation.

At Amherst street 13 tracks were crossed, including 4 of the New York Central, 3 of the Erie and 6 of the Lackawanna, while at Austin street 28 tracks were crossed, including 5 of the New York Central, 5 of the Erie, 7 of the Canadian National and 11 of the Lackawanna. The tracks of the New York Central include the two mains of its Niagara Falls branch, while those of the Erie and the Lackawanna include important interchange tracks; the remainder, including those of the Canadian National, are yard or other auxiliary tracks.

In determining the method of separation at Amherst and Austin streets—that is, track elevation or street depression—the problem was to balance the cost and inconvenience of constructing a high railroad fill for so many tracks against the cost and disadvantages of depressing the streets. A study of the conditions showed the most satisfactory and economical solution to be a compromise of track elevation and street depression. As a result, the tracks were raised over a distance of about a mile, the maximum raise being approximately 8 ft., while the streets were depressed from 9 to 10 ft. This afforded a minimum overhead clearance of 14 ft. at each bridge.



The Austin Street Subway Extends Under 28 Tracks

Track Raising Completed First

Because of the intensive use of the tracks of all four railways, the work of elevating them was carried out prior to the underpass excavation and the bridge construction. In fact, the track raising was completed approximately eight months before the street work was started. Throughout the track elevation work, and until the completion of the bridges at Amherst and Austin streets, all of the grade crossings in this territory were closed, street traffic being diverted to other crossings at the extreme north and south limits of the work.

To afford a pedestrian crossing of the tracks in this quite extended distance between open street crossings, a temporary viaduct was constructed immediately south of Amherst street. This structure, which was approximately 1,000 ft. long, was made up of timber frame towers, with light steel truss spans over the two main groups of tracks and a timber deck structure between and outside the groups of tracks.

The grading, while complicated by traffic, was carried out in the manner usually employed under similar conditions, being done in relatively light lifts, utilizing contractor's side dump cars, cranes and track raising machines, and working progressively across the body of tracks or otherwise as traffic conditions permitted. On all of the roads, except the Lackawanna, the work was done under contract, the Lackawanna carrying out its own raising and track work with company forces. The filling material used was largely foundry slag secured from local industries. Altogether, approximately 288,000 cu. yd. of filling were required.

I-Beam Type Bridges Used

The underpasses at Amherst and Austin streets are of much the same type and involved much the same problems of construction, except that at Austin street, owing to a relatively soft clay that was encountered, pile foundations were required to carry the bridge footings. Essentially, the bridges are steel structures with ballasted decks, supported on mass-type abutments at the street lines and a continuous, multiple-arch type pier longitudinally through the center of the street. Both undercrossings provide a street width of 66 ft., with two clear roadways 24 ft. 6 in. wide and two 6-ft. sidewalks.

The deck structure, which is practically similar for

all four roads, consists of a series of I-beams covered by steel plates, which was given a drainage pitch with a light tapering concrete slab, waterproofed on top. This slab ranges from 6 in. in thickness at the center to 1½ in. at the sides of the bridges, while the waterproofing consists of two layers of cotton fabric laid in three moppings of hot asphalt. Drainage from both sides of the bridges was provided for by placing stone packing back of the damp-proofed abutments and by weep holes at the base of the abutments to carry off the water to the street drainage system.

The waterproofing course of the bridges was protected by 4-in. by 8-in. by 1¼-in. asphalt paving blocks, which carry the stone track ballast. With a minimum of 8 in. of ballast beneath the ties, the minimum depth of the bridge decks, from base of rail to the under side of the steelwork, is approximately 50 in.

Since a continuous bridge structure beneath all of the tracks of the four roads at Austin street would have resulted in an extremely dark underpass unless artificially illuminated at all times, advantage was taken of the space between the tracks of the different roads to provide natural daylighting. Thus, the track crossings at this street were constructed as a series of multiple-track bridges rather than as one continuous structure. In the narrow openings between the bridge sections, steel gratings were provided over the street roadways, and skylights of prism glass were provided over the sidewalks. This not only permitted natural light to pass into the subway, but also acted as a safeguard to the public against ballast or other objects falling from the track level.

At Amherst street there are two separate bridges approximately 170 ft. apart, one bridge carrying the Lackawanna's tracks and the other carrying the tracks of the Erie and the New York Central. No cover was provided between these bridges. The outside facia girders of the bridges at both Austin and Amherst streets were made deep, with pylons at the center and ends to enhance their appearance as seen from the approaches, while the inside facia girders were made of sufficient depth only to retain the track ballast.

Piles Necessary at Austin Street

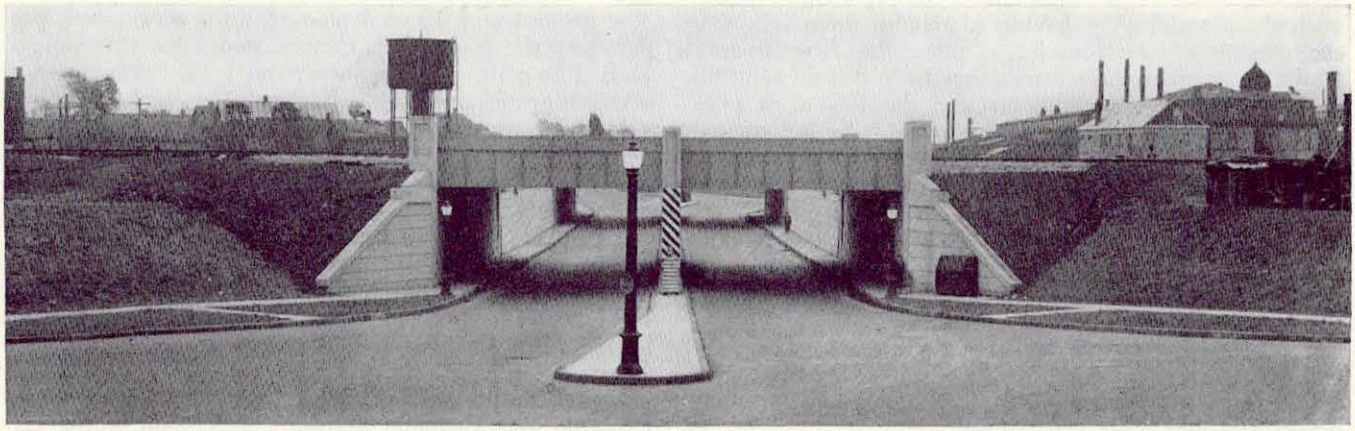
The problem of bridge construction at both streets was essentially the same, involving the excavation for the depressed street opening, the construction of the abutments and center pier, and then the deck structure. The manner in which this work was done varied somewhat with the importance of the tracks and the difficulties encountered. At Amherst street, while complicated by railroad traffic, the work was carried out without much difficulty. Where the tracks could not be given up for any appreciable length of time, pile falsework was driven beneath them, under traffic, and then, with traffic diverted exclusively to these supported tracks, excavation was made beneath them and in the areas where the tracks could be removed.

Looking Up Between Bridge Sections at Austin Street, Showing Provision for Daylighting the Long Subway, with Protection for Vehicles and Pedestrians

Excavation was made largely with a drag-line bucket, working from one or both sides of the railroad property, the bucket being pulled back and forth by cable attached to a motor truck which operated in the open, outside the limits of the tracks. Near the center of the crossing, some of the material was hauled by the bucket to the track level, at right angles to the underpass, this being done by a motor truck operating on the track level between tracks. In both cases, the excavated material was placed in trucks for disposal, by cranes with clamshell buckets. Considerable hand digging was necessary in and around the pile falsework, and, because of the character of the material encountered, much of this had to be done with pneumatic spaders.

The concrete used in the bridge construction was prepared at a central mixing plant at each bridge site, where a one-yard mixer and suitable batching equipment were provided. From the mixer, the concrete was moved through the subway in a three-yard bin car. At the point of placing it was dumped in batches into a one-yard bucket, which was then raised to the track level by a locomotive crane on that level and dumped into a tremie for placing in the forms.

At Amherst street no footing piles were necessary to support the abutments and center pier, and, therefore,



Looking East Along the Center-Line of the New Amherst Street Subway

the concreting of these structures followed closely upon the completion of the excavation work. At Austin street, however, the bridge construction was complicated by encountering an unstable clay formation, with some water, which would not in itself support the abutments and center pier. As a result, creosoted piles were driven, the piles used being approximately 40 ft. in length and placed on centers ranging from 2½ to 4 ft.

Falsework Distorted by Pile Driving

The Lackawanna, which was the first to attempt the placing of the pile foundations, had placed four of its tracks on falsework and excavated beneath them in advance of the foundation work. Unfortunately, the driving of the foundation piles caused severe heaving of the falsework piles, throwing the falsework trestles completely out of line and surface. In some cases the movement was as much as 15 in.

Unable to operate over the disturbed trestles, the Lackawanna detoured traffic to its most westerly track and the pile foundations were then completed, irrespective of the further distortion caused in the trestles. Upon the completion of the foundations, the uneven decking was stripped from the falsework trestles and later replaced after the heaved and bent falsework piles had been straightened and cut off as required.

The other three roads, whose work had not progressed as far as that of the Lackawanna, profited somewhat by the experience of that road. The Canadian National, for example, had planned originally to support three tracks on falsework, and then, after excavation, to drive foundation piles in the usual manner. Observing the action of the falsework under the Lackawanna's tracks, however, it abandoned this method of construction and carried out its excavation work as an open cut, taking two or three tracks out of service at a time. This method severely affected operation on the road's tracks, and, in fact, resulted in all of the tracks being out of service for a considerable period, but, since the tracks involved were essentially yard tracks and the road could make arrangements elsewhere for handling cars temporarily, the procedure adopted was considered more desirable and economical than running into the adverse conditions encountered by the Lackawanna. Excavation progressed from the west side of its property, and the pile foundation and masonry construction proceeded as fast as the excavation permitted. The new steel deck structure was then erected just as soon as possible to permit the earliest possible reuse of the tracks.

By the time the Lackawanna work had evidenced the effect of driving foundation piles on the temporary track falsework, the Erie had already driven falsework piles for two tracks. The deck structures had not been constructed, however, so, rather than complete these trestles with the possibility of having to rebuild them following the placing of the foundation piles, the Erie diverted traffic to its other three tracks that were still on solid fill, and then, after excavating around the falsework piles, drove the necessary foundation piles. As anticipated, the driving of the foundation piles caused the falsework piles to heave and to be thrown out of line. However, with no deck structure on them, the work of straightening them and of providing a deck structure was much lighter and less costly than the Lackawanna work.

Upon completion of the falsework for the two tracks, traffic was shifted back to these tracks and open excavation was made beneath the other three tracks which had carried all traffic temporarily. Following this latter excavation, foundation piles were driven and the abutments and pier were constructed.

The New York Central had already driven falsework piling for its two main tracks and the lead to its Military yard when the difficulties under the Lackawanna tracks developed. The decking, however, had not been put in place. To avoid the difficulty encountered on the Lackawanna it followed much the same practice employed on the Erie—that is, it shifted traffic from the two main tracks and, after excavation and driving of the foundation piles, straightened up and cut off the heaved falsework piles and constructed temporary decks for train operation. When all traffic had been shifted to the two tracks supported on falsework, excavation was completed under the other tracks and the necessary foundation piles were driven. In this latter work the falsework piling already driven for the Military Yard lead was badly distorted, but, because of the importance of the lead, the piling was straightened and fitted with a deck structure to permit the resumption of traffic as soon as possible.

Deck Waterproofing Details

The steelwork at both streets was erected in sections under each road's tracks, specific tracks being taken out of service at a time. At Amherst street the New York Central and the Erie initiated service on their bridges before the deck waterproofing was installed, and then, later, when most convenient, interrupted traffic on one or two tracks at a time long enough to place the waterproofing. The Lackawanna, however, waterproofed its bridge deck as constructed, before any traffic was put over it. This latter practice was followed by all of the roads at Austin street. In all cases, except on the Lackawanna, high early-strength cement was used to shorten the period of construction.

Where the waterproofing work was delayed, the tracks were put in service with the ties resting on temporary blocking. This restored the tracks to service earlier than would have been possible otherwise, but required disturbing them later. In some cases where the blocking interfered with the riveting of the steel plate of the deck structure, it was necessary to cut the track at the ends of the bridge and to shift it laterally in order to permit riveting.

Also, when it was desired to waterproof the deck it was necessary to remove the tracks entirely. This latter operation was done with locomotive cranes, which lifted the sections of track bodily and set them back on the bridge approaches until the concrete slab, the waterproofing and the asphalt protection course could be placed. Then the track was picked up again and replaced and ballasted with stone.

Planning and Organization of the Work

The work at Black Rock was planned and carried out by the four roads, co-operating with the Grade Crossing and Terminal Station Commission of the City of Buffalo. The general and detailed plans for the work were prepared by the New York Central under the direction of F. B. Freeman, chief engineer, and J. G. Brennan, engineer of grade crossings. Each of the four roads held a separate contract with the bridge contractor, but the field work for all roads was carried out by the New York Central and was under the direction of R. H. Kugler, F. P. James and J. W. Muschette, assistant engineers of the Central.

The grading and track work for all of the roads, with the exception of the Lackawanna, was done by the Hecker-Moon Company, Cleveland, Ohio, while the bridge work for all roads was done by the Walsh Construction Company, Syracuse, N. Y. The approach work was carried out under the direct supervision of the Grade Crossing and Terminal Station Commission of the City of Buffalo.

Passenger Rates and Revenues*

A statistical study of the possibilities of greater earnings through rate adjustments

By Berkeley Robins

AMONG the many things that are disturbing the economic outlook of the country is the alarming downward trend in railway passenger revenues. Various reasons have been given for the continued decline since 1920, the bus taking its share of the blame with the private automobile.

If it is to be granted that the day of the passenger train is over, that the pride of the early twentieth century is to take its place with the river packet and the stage-coach, nothing can be done save make the best of a dying industry. Before granting a conclusion such as this, it would be well to remember that railway passenger transportation is fundamentally mass transportation, and, as yet, no other form of transportation has been developed to equal it in the performance of this function. The private automobile has many advantages over the train, but it is essentially individual transportation with decided limitations in the handling of large numbers of people between two given points. The bus and the airplane provide mass transportation, but on a much smaller scale than the passenger train.

Railway Still Most Economical Agency for Mass Transport

There is no question that these various forms of competition with the passenger train fill an important economic need. The airplane has a practical monopoly on speed over long distances with which no form of land vehicle may hope to compete. The bus should be able to afford pick-up and local service at prices ruinous to railway transportation. The private automobile has a flexibility and adaptability which no form of mass transportation could equal. The passenger train is left only the field of large scale mass transportation.

The only economic excuse for mass transportation or mass production of any kind is its low cost. Therefore in any consideration of the causes for the decline in railway passenger revenue the important element of cost to its patrons must be considered.

Chart A shows the commonly used statistics of railway passenger traffic plotted on a logarithmic scale. Curve I, railway passenger revenue in hundreds of millions of dollars for each year since 1900, is the cause for concern. Curve II is the passenger miles for the same years in tens of billions, and shows the actual use of the railways for passenger purposes. Curve III is the revenue per passenger mile in cents and represents the actual fare per mile or the average cost to the public for service. It is perhaps worth noting at this time that both Curves I and II start upon their decline as Curve III, the cost, reaches its peak.

The curves in Chart A are, unfortunately, unsuitable for use in any thorough economic study as they include elements having no direct relation to the fundamental problem of transportation. For instance, Curve II registers the use of the railways for passenger purposes, but it also registers to some extent the growth of the country. In other words if the United States doubled in population in 20 years it would naturally be expected that the amount of passenger traffic

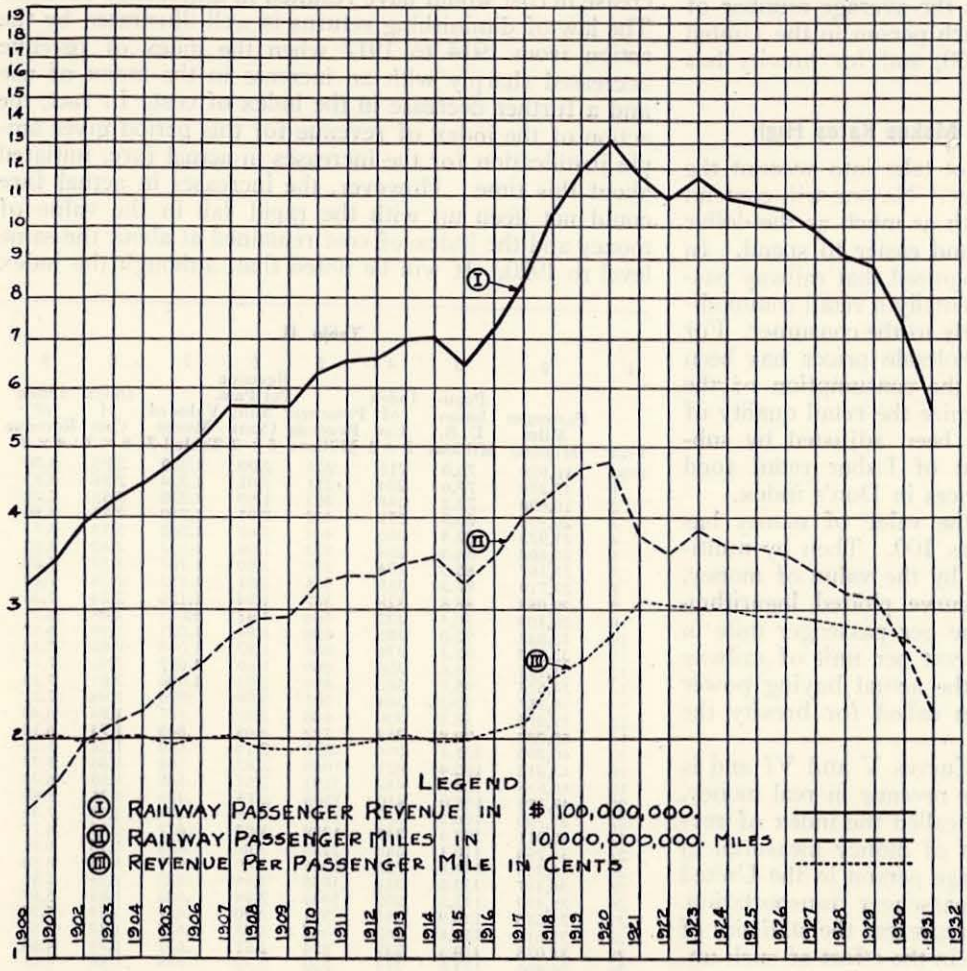

LEGEND
(I) RAILWAY PASSENGER REVENUE IN $ 100,000,000.
(II) RAILWAY PASSENGER MILES IN 10,000,000,000. MILES
(III) REVENUE PER PASSENGER MILE IN CENTS

Chart A—Passenger Traffic Statistics

* This article, in the belief of the editors, presents a new approach to the passenger traffic situation on the railroads, although the method followed is familiar enough in other fields. Because of the novelty of this treatment of this particular problem, the editors reserve final opinion as to its applicability in the premises, pending further discussion, which is invited.

Table I—Real Value of Money

Year	Dun's Clothing 1	Wholesale Prices Metals 2	Miscellaneous 3	Total 4	Value of Dollar Dun's except food 5	Value of Dollar U. S. Dept. Lab. Retail food 6	Value of Dollar Avg. of 6 & 7 1913 = 100 7
1900	16.324	14.834	16.070	47.228	1.244	1.455	1.350
1	15.098	15.344	16.617	47.059	1.247	1.400	1.324
2	15.533	16.084	16.826	48.443	1.213	1.328	1.270
3	17.136	16.544	16.765	50.445	1.167	1.333	1.250
4	16.514	15.428	16.919	48.861	1.202	1.318	1.260
5	17.986	15.916	17.061	50.963	1.154	1.311	1.233
6	19.177	16.649	19.555	55.381	1.062	1.272	1.167
7	20.355	17.688	20.335	58.378	1.008	1.216	1.112
8	17.233	16.542	18.359	52.134	1.126	1.185	1.156
9	20.062	16.426	20.828	57.316	1.025	1.125	1.075
10	21.173	16.744	22.936	60.853	.967	1.075	1.021
11	19.324	16.583	22.669	58.576	1.001	1.088	1.045
12	20.449	16.349	21.471	58.269	1.009	1.025	1.017
13	20.534	16.512	21.739	58.785	1.000	1.000	1.000
14	20.834	15.691	21.425	57.920	1.015	.977	.996
15	20.902	16.607	22.561	60.069	.968	.985	.977
16	25.800	21.174	25.799	72.773	.807	.882	.845
17	36.527	32.390	29.617	98.534	.596	.683	.640
18	45.238	30.170	35.349	110.757	.531	.593	.562
19	45.623	25.759	35.435	106.817	.550	.539	.545
20	50.268	31.172	46.220	127.660	.460	.492	.476
21	28.034	23.037	33.795	84.866	.693	.652	.674
22	34.459	21.450	34.855	90.764	.647	.707	.677
23	39.929	23.796	38.587	102.312	.573	.683	.628
24	37.925	22.515	35.851	96.291	.610	.687	.649
25	38.334	21.908	36.049	96.291	.610	.635	.623
26	33.741	22.734	37.159	93.634	.627	.623	.625
27	33.187	22.351	37.551	93.089	.630	.643	.637
28	36.543	20.796	36.646	93.985	.625	.647	.636
29	34.578	21.314	36.640	92.532	.635	.639	.637
30	30.657	19.925	34.911	85.493	.688	.680	.684
31	25.934	18.955	31.459	76.348	.770	.822	.796

would also double. Therefore, in order to divorce the growth of population from the use of the railways and obtain an index which will reflect the gain or loss in use of the railways due to causes within our control, the passenger miles for each year may be divided by the population of the United States for that year. The results of this division are plotted logarithmically in Chart B as Curve V. This curve shows the average number of miles in hundreds traveled by each person in the United States for every year since 1900, and for brevity has been called the index of use.

Fall in General Price Level Makes Rates High

Curve III in Chart A does not take into account the fluctuations in the value of money. No one will contend that the dollar of 1920 was worth as much as the dollar of 1931. It was easier to get and easier to spend. In this study the fact has been recognized that railway passenger transportation is fundamentally a retail commodity, being sold in small lots directly to the consumer. For this reason Dun's index of wholesale prices has been used, as it is predicated upon the consumption of the average man. In order to recognize the retail quality of transportation Dun's index has been adjusted by substituting the U. S. Department of Labor retail food index for the wholesale food prices in Dun's index.

Using this combined index the value of money has been computed based on 1913 as 100. Then by multiplying the values of Curve III by the value of money, Curve VI is obtained. This curve plotted logarithmically in Chart B is the revenue per passenger mile in real money and represents the cost per unit of railway transportation as measured in the actual buying power of money. Curve VI has been called for brevity the index of cost.

Curve IV is the product of Curves V and VI and is the per capita railway passenger revenue in real money. For brevity this curve has been called the index of revenue. It represents the amount of money measured in purchasing power that the average person in the United States pays to the railways for passenger transportation.

The curves in Chart B, then, represent the statistics of railway passenger revenue wherein the effect of such unrelated variables as are known to exist are eliminated. Now in studying these curves it is necessary to grant two laws. First there is the law of supply and demand whereunder an increase in the supply of a commodity tends to lower the price and an increase in the demand tends to raise the price. In the particular case of railway transportation it may be assumed that the supply is unlimited or that transportation can be furnished to all who desire it. This condition, according to the law, would cause a very low price; therefore the price is fixed by artificial means. Thus, with unlimited supply and an artificial price the only thing that can vary is the demand. Under such conditions it is generally granted that the demand varies in some inverse ratio to the price. That is, the lower the price the greater the demand.

The second law that must be granted is that of diminishing returns. This law recognizes the fact that if the price be reduced below a certain point the consequent increase in the volume of business will not compensate for the lower price and a diminution in total revenue will ensue.

Rates Too Low 1917-20

Now if Chart B be examined with these two laws in mind the following facts will be observed. From 1900 to 1908 Curve IV, the index of revenue, shows a steady rise accompanied by a rise in the index of use and a drop in the index of cost, illustrating the fact that a lowering of the cost induced sufficient increase in demand to result in an increase in total revenue. From 1908 to 1914 the index of revenue had a very slight downward trend. The small increase in the index of use and the small decrease in the index of cost indicates that the point of maximum revenue had been reached and further decrease in cost would have resulted in diminished revenue. The law of diminishing returns is well illustrated by the action from 1914 to 1917 when the index of revenue decreased sharply with an increase in the index of use and a further decrease in the index of cost. In fact, the action of the index of revenue for this period gives ample justification for the increases in actual fare, initiated about this time. However, the increases in actual fare could not keep up with the rapid fall in the value of money and the index of cost remained at about the same level to 1920. It will be noted that, although the index

Table II

1 Year	2 Passenger Miles Millions	3 Population U. S. Millions	4 Index of Use 2 ÷ 3	5 Passenger Revenue Millions	6 Revenue Per Pass. Mile, Cents 5 ÷ 2	7 Value of Money Table I-7	8 Index of Cost 6 × 7	9 Index of Revenue 4 × 8
1900	16,038	76.0	211	324	2.00	1.350	2.70	5.70
1	17,354	77.6	224	351	2.01	1.324	2.56	5.73
2	19,690	79.2	248	393	1.99	1.270	2.53	6.28
3	20,916	80.8	259	422	2.01	1.250	2.51	6.50
4	21,923	82.4	266	444	2.01	1.260	2.53	6.74
5	23,800	84.0	284	473	1.96	1.233	2.42	6.88
6	25,167	85.6	294	510	2.00	1.167	2.33	6.85
7	27,719	87.2	318	565	2.01	1.112	2.24	7.12
8	29,083	88.8	328	567	1.94	1.156	2.24	7.35
9	29,109	90.4	322	566	1.93	1.075	2.08	6.71
10	32,338	92.0	352	629	1.94	1.021	1.98	6.97
11	33,202	93.3	356	656	1.97	1.045	2.06	7.33
12	33,132	94.6	350	660	1.99	1.017	2.02	7.07
13	34,673	95.9	362	696	2.01	1.000	2.01	7.28
14	35,357	97.2	364	703	1.99	.996	1.98	7.21
15	32,475	98.5	330	646	1.99	.977	1.94	6.40
16	35,220	99.8	353	722	2.05	.845	1.73	6.10
17	40,100	101.1	396	841	2.10	.640	1.34	5.30
18	43,212	102.4	421	1046	2.42	.562	1.36	5.73
19	46,838	103.7	452	1193	2.55	.545	1.39	6.28
20	47,370	105.0	450	1305	2.75	.476	1.31	5.89
21	37,706	106.7	354	1166	3.09	.674	2.08	7.36
22	35,811	108.4	330	1088	3.03	.677	2.05	6.77
23	38,294	110.1	348	1159	3.02	.628	1.90	6.61
24	36,368	111.8	325	1086	3.00	.649	1.94	6.30
25	36,167	113.5	318	1065	2.94	.623	1.83	5.81
26	35,499	115.2	308	1049	2.94	.625	1.84	5.67
27	33,656	116.9	288	981	2.90	.637	1.85	5.33
28	31,616	118.6	267	905	2.85	.636	1.82	4.85
29	31,078	120.3	259	874	2.81	.637	1.79	4.64
30	26,800	122.0	219	730	2.72	.684	1.86	4.07
31	21,800	123.7	176	555	2.52	.796	2.01	3.54

of cost remained constant, the index of use continued to rise, suggesting that the sudden drop in the index of cost of 1917 had caught the country unawares, resulting in a lag in the index of use. By 1919 this lag had been overcome and the curves resumed their normal relation. The rise in the value of money in 1921 coupled with the increase in actual fare, noted in Chart A, caused an increase in the index of cost and brought it about back to the value of 1911 at which we had previously noted the maximum revenue. There was the expected curtailment in the index of use, and the expected maximum for the index of revenue. From 1921 on Chart B is very discouraging. A continued fall of all three curves suggests that the laws previously noted had ceased to operate. The only glimmer of hope occurs in the action from 1929 to 1931. Here the rise in the index of cost accelerated the downward tendency of the index of use, an action that might have been expected.

Is Competition Stabilized Now?

It is well known that the railways have been subject to heavy competition for the past few years. Thus, as a tentative hypothesis, it might be assumed that the distressing action of the curves in Chart B from 1921 to 1929 were caused by changing conditions of competition. By the action of the curves from 1929 to 1931, however, we might tentatively conclude that these changing conditions have become stabilized, and the law of supply and demand is again operating—under different conditions.

Viewing Chart B as a whole, the marked similarity between Curves V and VI in reverse order, is immediately apparent, certainly as far as 1921. This is the relation that might be expected.

In Chart C the index of use is plotted against the index of cost. Each dot in Chart C represents the cost and use condition of one year and the small numeral beside the dot gives the year. It is immediately apparent that a smooth curve may be drawn through the bulk of the points from 1900 to 1921. The curve drawn is the solid part of Curve VII. All of the points for this period lie fairly close to this curve except those from 1915 to 1918. From the lag noted for this period in Chart B, this was to be expected, but there are a number of other reasons that might be given for the apparent discrepancy. It must be remembered that these years were years of enormous production, and it is possible that a great number of the people of the United States were too busy to indulge in the comparative luxury of travel. An explanation is also available in the fact that in a period of rising prices the wages of labor usually lag; so that a large number of the people may not have been able to travel. In any event by 1919 adjustments had been made, people had become used to the cheapness of travel and could avail themselves of it; increased efficiency of production and troops returning had given more leisure to the masses; wages had increased giving more wealth to the masses; and railway transportation was extensively used. In fact, under such conditions, this period might be called the exception that proves the rule.

Therefore it should be permissible to assume that the solid part of Curve VII represents the normal relation between cost and use of railway transportation from the year of 1900 to 1921. The equation $y = 505 - 29\,x^{2.33}$ fits the line within the limits for which it is drawn. It is obvious that Curve VII has no relation to the points for the years since 1923. But it will be observed that the points for the last three years do take naturally a position suggesting some similar sort of curve. These two points are of course insufficient data on which to base any new curve, and it becomes necessary to make a few assumptions.

A Limit to Demand for Transport

If the nature of railway transportation be further examined some logical basis for assumptions may be found. Generally speaking the first thought is to assume for any commodity which is furnished free of cost. Free commodities with unlimited supply are hard to find. Sunshine and air are the classical examples, and it is obvious that there is a definite limit to the amount of these commodities used. The per capita consumption of air or oxygen is a very small proportion of the total available at no cost, and has a definite measurable limit. In the case of railway transportation the fare is not the sole cost of transportation. Food and lodging must be provided, and the lower the fare a smaller proportion of the total cost it becomes. There is also the element of time. If railway transportation were free it is folly to suppose that every one would spend his entire time riding the trains. Most people have to earn a living and have not the time to spare for promiscuous riding of trains. Many a railway employee refrains almost entirely from travel, even though it is free for him. Now, as long as a definite limit to the amount of railway transportation that would be used under no fare is apparent, it would certainly not be far wrong to assume

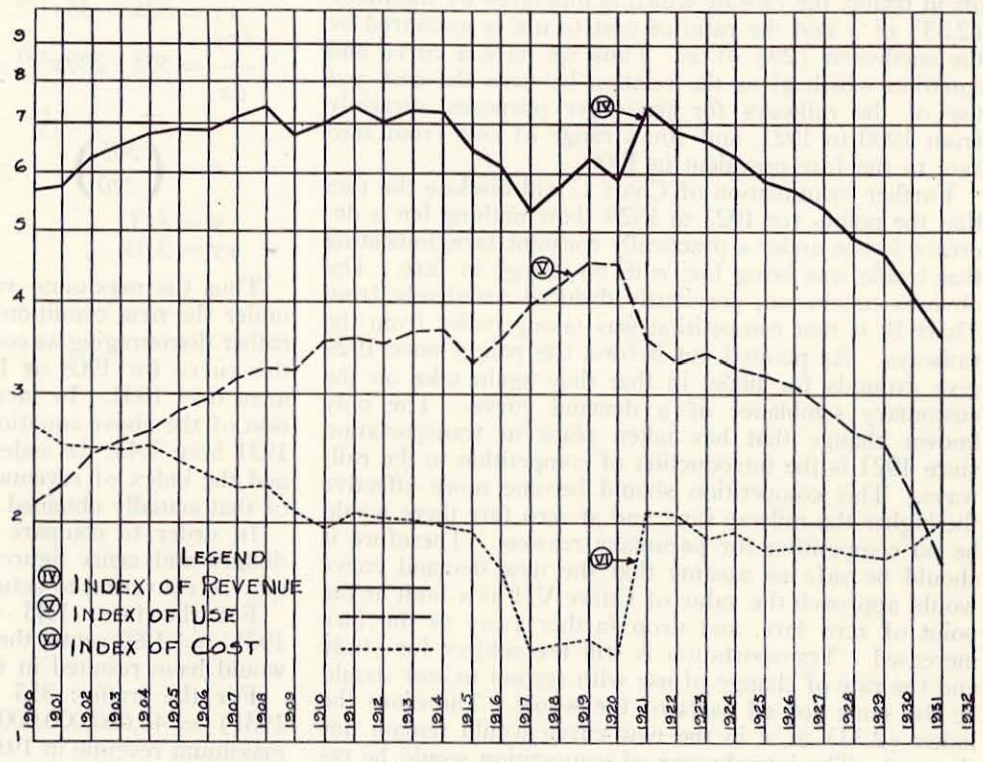


Chart B—Passenger Statistics Adjusted for Changes in Population and Value of Dollar

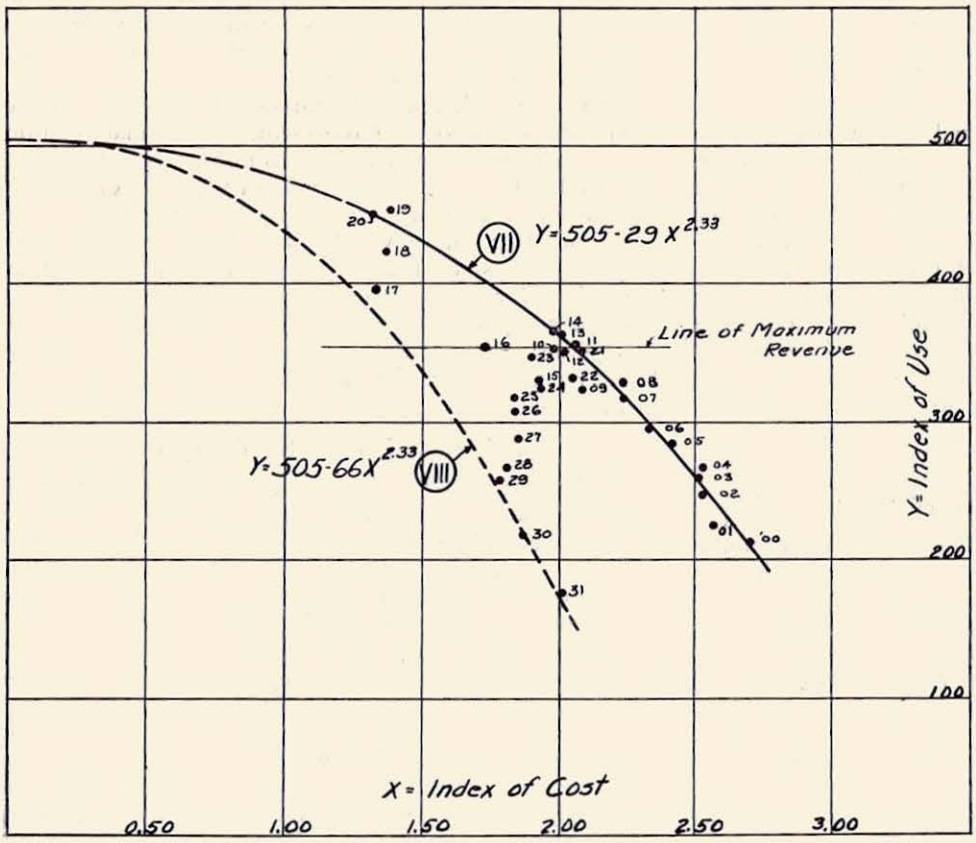


Chart C—Demand Curves (Actual Passenger Miles per Inhabitant at Actual Rates—Real Money—With Theoretical Patronage at Other Rates

that limit, which is indicated by past experience, or by the extension of Curve VII to the left edge of Chart C. This extension, shown by the dashed part of Curve VII, strikes the zero fare line at 505 per capita passenger miles. From this point, according to the equation for Curve VII, any increase in fare will result in a falling off in traffic, the rate of which is measured by the index (2.33) of x and the ratio of cost to use is measured by the coefficient (29) of x. Thus we have a curve and equation which gives the relation between the cost and use of the railways for passenger purposes, certainly from 1900 to 1921, and for a range of cost from zero fare to the fare prevalent in 1900.

Further examination of Chart C will disclose the fact that the points for 1923 to 1929 show nothing but a decrease in use under a practically constant fare, indicating that traffic was being lost with no change in fare. The obvious conclusion, previously deduced tentatively from Chart B, is that competition was taking traffic from the railways. As pointed out before, the points since 1929 give grounds for hope, in that they again take on the customary semblance of a demand curve. The only known change that has taken place in transportation since 1921 is the introduction of competition to the railways. This competition should become more effective the higher the railway fare, and at zero fare there would be no competition for pecuniary reasons. Therefore it should be safe to assume that the new demand curve would approach the value of Curve VII as a limit at the point of zero fare, and drop farther away as the fare increased. Transportation is still the subject for study and the rate of change of use with respect to cost should be the same for all parts of the whole. Therefore the index (2.33) of x in the new curve would remain unchanged. The introduction of competition would be reflected in the coefficient of x which gives the relation between cost and use. Under these assumptions a curve, such as Curve VIII, can be passed through the point of use at zero fare indicated by Curve VII and the point for the year 1930 retaining the same rate of change. The new demand Curve, VIII, has the equation $y=505-66x^{2.33}$ and may be called the demand curve for railway passenger transportation under competition. It will be observed that Curve VIII passes very close to the points for the years 1929 to 1931, and lends support to the assumption that competition has become stabilized in these later years. The program of road building has now reached the point where fairly good roads are available to all points served by the railways, with enough private automobiles and buses in the country to make available to everyone this form of transportation. We may assume that competition is unrestricted and probably relatively stabilized.

Now, with the demand curve for railway passenger traffic constructed upon fairly reasonable assumptions, it is time to consider the revenue. As noted in Chart B the index of revenue is the product of the index of use and the index of cost. Therefore, if we place the derivative of this product equal to zero and solve, the result will indicate the point of maximum revenue.

$$y = 505 - 66x^{2.33}$$
$$xy = 505x - 66x^{3.33}$$
$$\frac{dxy}{dx} = 505 - 220x^{2.33} = 0$$
$$x = \left(\frac{505}{220}\right)^{\frac{1}{2.33}} = 1.43 \quad \textit{Index of Cost}$$
$$y = 353 \quad \textit{Index of Use}$$
$$xy = 5.05 \quad \textit{Index of Revenue}$$

Thus the maximum value for Curve IV in Chart B under the new conditions of competition is 5.05 and is rather discouraging as compared with the actual value of this curve for 1908 or 1921, but is a decided improvement over 1931. In fact, the conclusion from the solution of the above equation is: Had the index of cost in 1931 been 1.43, the index of use would have been 353, and the index of revenue 5.05, or 40 per cent in excess of that actually obtained.

In order to compare this statement with the actual dollars and cents figures for 1931 the various indices may be converted to actual values.

For the fare: 1.43 ÷ 0.796 (value of money in 1931) = 1.80 cents, the theoretical average fare which would have resulted in maximum revenue in 1931.

For the traffic: 353 × 123,700,000 (population in 1931) = 43,600,000,000. passenger miles necessary for maximum revenue in 1931.

For the revenue: 0.018 × 43,600,000,000 = $785,000,000 for maximum revenue in 1931 as compared with the

actual revenue of $555,000,000. Thus if the average fare had been reduced to 1.80 cents instead of the 2.53 prevalent in 1931, passenger revenues, according to these calculations, could have been increased by $230,000,000. Using the appropriate figures for 1930 shows a theoretical maximum revenue of $910,000,000 in that year as against the $730,000,000 actually received.

Unfortunately the value of money fluctuates from time to time making it difficult to fix a definite actual fare at which the railway passenger revenue will be at a maximum. Under conditions prevailing in 1931 the index of cost should be 1.43 which would correspond with the actual fare only under the conditions of 1913, where the value of a dollar was arbitrarily assumed as a dollar. At the present time it is hardly safe to predict just what the value of the dollar will be in the future, but in any event there is no denying the fact that railway fares are much too high at the present time. Concrete evidence of the recognition of this fact is given in the average rate of 2.52 for 1931 which represents by means of excursions, special rates, and so forth a discount of about 30 per cent under the standard rate of 3.6 cents. If it be assumed that the normal rate for excursions is half fare, by simple computation on the figures for 1931 we arrive at the conclusion that less than 40 per cent of the traffic for that year was at the published fare. This suggests the inadvisability of maintaining the existing rates.

Now if the base rate were reduced 1.75 cents per mile, at least a 40 per cent increase in revenue ought to ensue if the above computations are correct. By referring to Chart C it will be observed that the point for maximum revenue for both curves occurs at the 353 index of use point. By bearing this fact in mind and keeping accurate record of business, it ought to be possible to so regulate excursion and round-trip rates, as to keep the average price at the point at which it would produce an average annual travel of 353 miles per inhabitant of the United States. Control such as this should enable the railways to maintain their passenger traffic very near the point of maximum money patronage per inhabitant, with the resulting increase in gross revenues so badly needed at this time.

Railroads Find Comparative Quiet Along the Potomac

WASHINGTON, D. C.

AMID all the hurly-burly of a hot summer in Washington in the throes of a new deal, the railroads seem almost neglected this year when comparison is made with some previous summers in which emergencies have ruined official and other vacations. While other industries are undergoing the new process of being "codified" under the national industrial recovery act and being asked to agree to increase wages, to reduce hours of employment and to adopt rules of fair practice, the railroads, for the time being, are being given more opportunity than they have during many summers to devote their energies to railroading and handling an increased traffic.

Of course they are by no means completely neglected by officialdom, because the Interstate Commerce Commission is still on the job and there are numerous other governmental agencies with which they have to deal on various phases of their business, including this year for the first time the question of the amount of their official salaries, but the railroads have been regulated for so long that their position in Washington just now is one approaching calmness in contrast with that of industries having their first experiences with the National Recovery Administration.

There are several features of the new deal that directly affect the railways and the federal co-ordinator of transportation and his staff are foregoing vacations while busily engaged in studying out some new ones, but they are so far merely getting started and have done nothing spectacular as yet beyond urging the railroad executives to cut their salaries some more, if the Reconstruction Finance Corporation or courts have not already done so for them in loan and reorganization proceedings.

Industry in general is being required to agree on codes of fair competition, minimum wages and maximum hours of employment, to be rewritten by or under pressure of administration officials under a "partnership" with a government which has the deciding voice, and, because their codes have been arriving in Washington so rapidly that the necessary hearings on them would probably consume several months, employers are now being asked to enter into individual agreements with the President to place the general plan for increasing wages and the number of employees in effect by September 1 or before. The request was directed to "all employers" but it is the general understanding that the law under which all this is being done, the national industrial recovery act, does not apply to the railroads because they have been much more rigidly codified for many years, although the laws under which they are regulated do not include some features of the proposed blanket code or agreement.

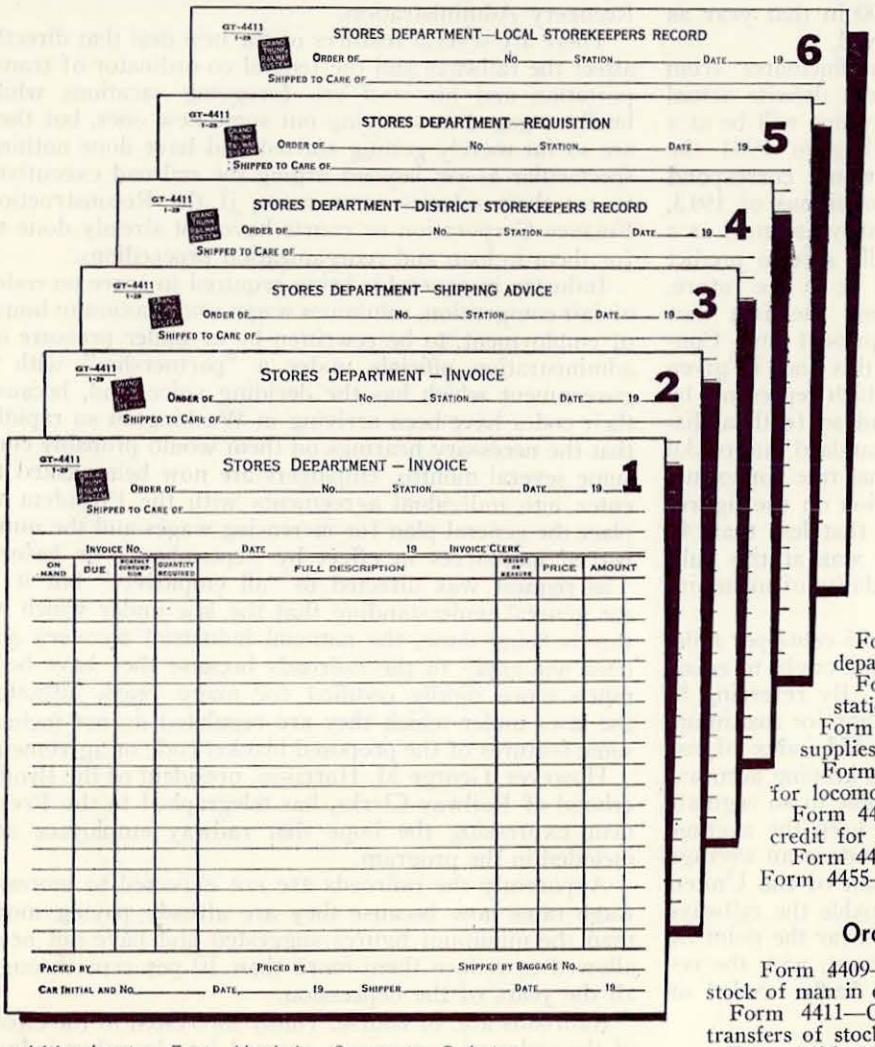
However, George M. Harrison, president of the Brotherhood of Railway Clerks, has telegraphed to the President expressing the hope that railway employees are included in the program.

Apparently the railroads are not expected to increase wage rates now because they are already paying more than the minimum figures suggested and have not been allowed to reduce them more than 10 per cent through all the years of the depression.

Railroads are, of course, vitally interested in the effect of the codes or agreements entered into by other industries, both because they will in many instances have to pay the resulting increased prices and because they will profit by increased traffic if the plan has the effect of increasing business as expected. They will be especially interested in the code to be submitted by the railway supply and equipment manufacturers, on which some preliminary conferences have been held, as well as those submitted by the iron and steel, coal, oil and lumber industries, because of the effect on their purchases, and they are waiting with interest the results of the efforts being made to develop codes for the motor truck and bus operators because the provisions relating to wages, hours, and adherence to tariff schedules would have an important effect on the competition between rail and highway transportation.

It is suggested that the conditions under which this competition is conducted would be improved by any degree of stabilization of highway transportation, but the possibility has also been suggested that a plan of regulation worked out under the recovery act might be such as to tend to perpetuate some of the handicaps of unequal regulation under which the railroads now operate, and it is believed that the character of such a plan will depend to a considerable extent upon the degree in which it is influenced by the manufacturers of motor vehicles and the shippers who own their own trucks who are also in competition with the common carrier operators.

Forms Keep G. T. W. Stores in Step


GT-4411
STORES DEPARTMENT—LOCAL STOREKEEPERS RECORD
ORDER OF No. STATION DATE 19 6
SHIPPED TO CARE OF
STORES DEPARTMENT—REQUISITION
ORDER OF No. STATION DATE 19 5
SHIPPED TO CARE OF
STORES DEPARTMENT—DISTRICT STOREKEEPERS RECORD
ORDER OF No. STATION DATE 19 4
SHIPPED TO CARE OF
STORES DEPARTMENT—SHIPPING ADVICE
ORDER OF No. STATION DATE 19 3
SHIPPED TO CARE OF
STORES DEPARTMENT — INVOICE
ORDER OF No. STATION DATE 19 2
SHIPPED TO CARE OF
STORES DEPARTMENT — INVOICE
ORDER OF No. STATION DATE 19 1
SHIPPED TO CARE OF
INVOICE NO. DATE 19 INVOICE CLERK
ON HAND
DUE
QUANTITY REQUIRED
FULL DESCRIPTION
WEIGHT OR MEASURE
PRICE
AMOUNT
PACKED BY PRICED BY SHIPPED BY BAGGAGE NO.
CAR INITIAL AND NO. DATE 19 SHIPPER DATE 19

Requisition-Invoice Form Used by Stores in Ordering Material from Other Stores—All Copies Made at One Time

Systematic procedure intended to secure effective control and prevent confusion—Shows complicated nature of supply functions

OF the many things which enter into the problem of providing a railroad day by day with the materials necessary to its operation and maintenance, few better illustrate the multiplicity of detail involved and especially the role of the stores department than the forms employed to express the user's wants, regulate the flow of materials and to account for results.

The forms used on the Grand Trunk Western are a result of study made at the time of the reorganization of the supply departments of all lines of the Canadian National system. In the interests of orderly and coordinated stores operation, approximately 35 forms are required in the routine stores work, not counting carbon copies or forms prepared by the purchasing department. Not all of these forms are required in connection with the procurement or distribution of material. Some are shelf cards, stock records and others provide standing reports, although most of them are used in quantity every day in the conduct of the supply work on this road with the Canadian National system. The forms are as follows:

Orders Prepared by Users

Form 4423—Requisition on storehouse for standard materials used in shops

Form 4401—Requisition on storehouse by other departments for supplies

Form 4407A—Requisition on storehouse for station supplies delivered by supply car

Form 4408A—Requisition on storehouse for section supplies delivered by supply car

Form 4419—Requisition on oil-houses for supplies for locomotives

Form 4459—Requisition on stores by shop men for credit for scrap and for material returned

Form 4410—Requisition on stores for stationery

Form 4455—Direct orders on oil stations for gasoline

Orders Prepared by Storekeepers

Form 4409—Requisition on district stores to replenish stock of man in charge of substores

Form 4411—Combined requisition-invoice form covering transfers of stock from one store to another

Form 4405, 4405A, 4405B—Requisition on purchasing department for standard material

Form 4406, 4406B—Requisition on purchasing department for special material

Form 4412—Back order for materials not available when filling original requisitions

Form 4441—Back order for stationery

Form 4440—Form for tracing material urgently required

Form 4458—Orders on shops to repair or manufacture material

Form 4426—Receipt for materials repaired or manufactured for stores by shop

Form 4413—Form for billing purchasers of company material

Form 4444—Shipping label for stationery

Form 4460—Order on gate-keepers to pass material

Form 4442—Notice of delay in furnishing stationery

Miscellaneous Reports

Form 4438—Report of uninvoiced material

Form 4415—Report of surplus materials in stock

Form 4418—Report of car seals issued

Form 4434—Daily report of cars held under load

Form 4432—Report of material received at scrap yard

Form 4433—Report of material shipped from scrap yard

Form 4435—Report of scrap invoices received and issued

Form 4437—Report of reclamation-plant operation

Form 4431—Monthly distribution of scrap-plant expenses

Form 4463—Card for permanent stock record system

Form 4416—Shelf card for application to storehouse shelves

Form 4430—Shelf card for stock protection

Form 4446—Record card of electrotypes used in printing form

Form 4468—Report of automobile and tractor inspection

Form 4429—Report of storehouse inspection

The important things to be said of the forms written

by users of material are that all orders for materials must be drawn on the stores and, secondly, that written orders must be prepared for all materials required. It is by this means that material can be accounted for, the cost properly distributed and shipments properly made. The shopman's requisition form of the G.T.W. is only 3 in. wide and 5½ in. long. These orders are supplied in book form and must be signed by authorized foremen. When the order is filled, the stockkeeper marks the order with the unit price taken directly from the shelf card, after which the total charge is computed in the stores office. A similar procedure is followed when scrap or other material is surrendered to the storehouse by shopmen for credit.

Shop forces, when drawing oils and waste for use in shops and enginehouses, use the regular shopman material requisition, Form 4423. Engine crews and locomotive attendants who draw oils and waste from the oil store at points where such supplies are issued to locomotives use a special form showing the quantity of each kind of oil drawn for each locomotive. At the close of each 24 hours, the quantities are totalled and the report signed by the locomotive foreman.

Printed Lists for Supply Cars

The conventional form of order is used by section and station forces for all supplies other than stationery to be distributed by supply car. Each requisition requires two sheets, each 14 in. wide and 17 in. long. On the section form is a printed list of 126 items common to track work, with spaces in which to show the quantity of each item required at 25 or more sections; also, the recapitulation of the quantity of each item required at all sections, the weight or measure, the unit price and the total value. The requisition for station supplies contains a printed list of 102 standard commodities. Each of these requisitions is prepared in triplicate by the division superintendent and, as the delivery of material is made, the form is returned to the district storekeeper where the prices are extended. The originals are then returned to the superintendent as an invoice.

Must Report Stock on Hand

All other materials, except stationery, are ordered on a form 6 in. high and 9½ in. wide, which must show the quantity of each item on hand, the quantity due on previous requisitions and the monthly consumption of each item of material ordered. This form has spaces in which the district storekeeper can show when the shipment of each item was made.

All orders drawn on the stores for stationery must show the number of employees using the stationery, the number of typewriters in use, and also the quantity of stationery on hand, and the average consumption per month, as well as the quantity being ordered. This form is prepared in triplicate and also provides space in which the storekeeper can mark unit prices and the total cost of each item furnished.

The G. T. W. has arranged with various commercial oil companies to supply oil to sections and other forces and issue a gasoline receipt book for this purpose. This receipt is prepared in triplicate, the original being given to the company.

Inter-Stores Orders Through

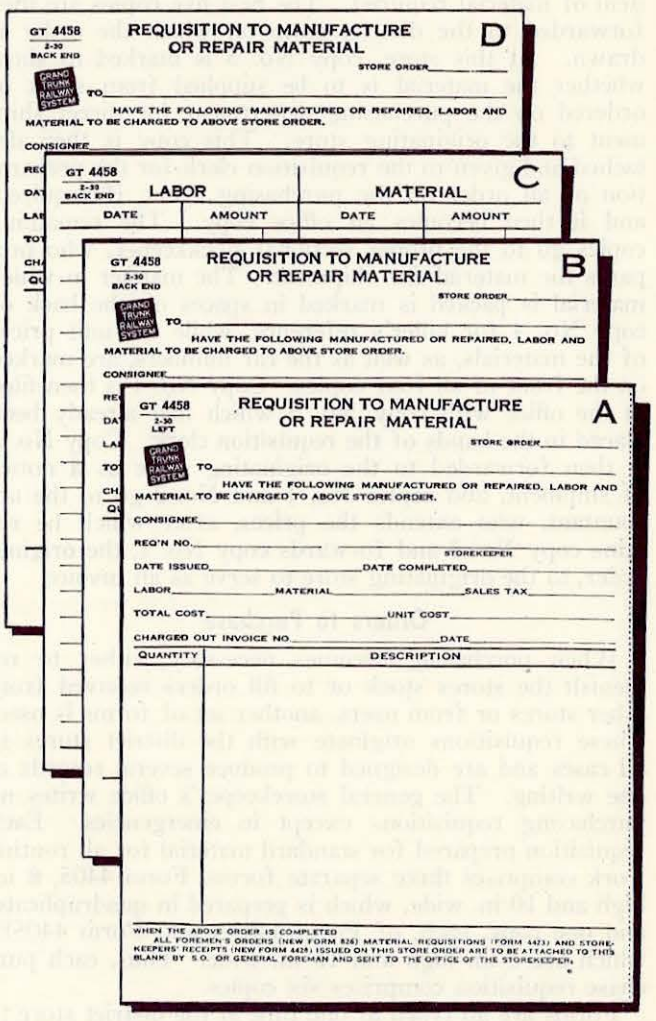
It is within the stores department, however, that forms reveal the intricate mechanics of supply work. The G. T. W., like other roads, maintain storehouses at various points, where quantities of material are kept in anticipation of every routine need. The substores keep only materials required locally and draw these materials as required from the larger stores. Other stores maintain stocks of materials for general distribution. It devolves upon each store to maintain a stock adequate for its needs and to replenish standard stocks or to procure special materials by orders drawn on other stores, on shops or upon the purchasing department, according to the kind and quantity of materials required. All this is done with the aid of forms, which record each step in the storehouse procedure from the time each item of material is ordered until it is finally purchased, received, shipped and delivered, or otherwise disposed of.

The distinctive manner in which the G. T. W. stores keep track of their stocks on hand by means of shelf cards attached to bins and by a visible card-record system with markers to indicate surplus materials or stocks needing replenishment, etc., has already been described, and attention is, therefore, directed to the forms by which this material is obtained.*

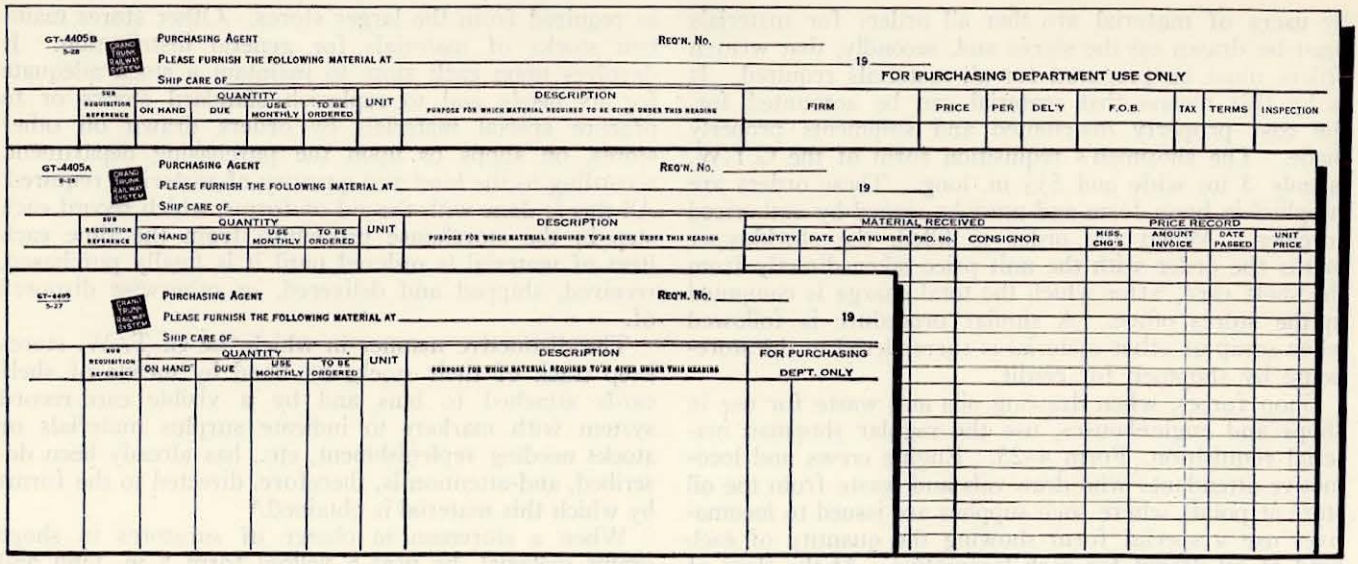
When a storeman in charge of substores in shops draws material, he uses a yellow form 5 in. high and 8 in. wide, giving the date, requisition number, store number and reporting the quantity and description of each item required. The stockkeeper at the district store marks the unit price on the original and then passes it to the office where the price is extended.

Where a divisional store finds it necessary to replenish its own stock or to obtain materials called for in requisitions received from the local storekeeper or from users, and where the material is to be obtained

* See *Railway Age*, December 31, 1932.



A Four-Copy Form Used for Ordering Material from Shops


GT-4405B 5-28 GRAND TRUNK RAILWAY SYSTEM
PURCHASING AGENT
REQ'N. No. _____
PLEASE FURNISH THE FOLLOWING MATERIAL AT _____ 19____
SHIP CARE OF _____
FOR PURCHASING DEPARTMENT USE ONLY
SUB REQUISITION REFERENCE | QUANTITY: ON HAND, DUE, USE MONTHLY, TO BE ORDERED | UNIT | DESCRIPTION — PURPOSE FOR WHICH MATERIAL REQUIRED TO BE GIVEN UNDER THIS HEADING | FIRM | PRICE | PER | DEL'Y | F.O.B. | TAX | TERMS | INSPECTION

GT-4405A 5-28 GRAND TRUNK RAILWAY SYSTEM
PURCHASING AGENT
REQ'N. No. _____
PLEASE FURNISH THE FOLLOWING MATERIAL AT _____ 19____
SHIP CARE OF _____
SUB REQUISITION REFERENCE | QUANTITY: ON HAND, DUE, USE MONTHLY, TO BE ORDERED | UNIT | DESCRIPTION — PURPOSE FOR WHICH MATERIAL REQUIRED TO BE GIVEN UNDER THIS HEADING | MATERIAL RECEIVED: QUANTITY, DATE, CAR NUMBER, PRO. No., CONSIGNOR, MISC. CHG'S | PRICE RECORD: AMOUNT INVOICE, DATE PASSED, UNIT PRICE

GT-4405 5-27 GRAND TRUNK RAILWAY SYSTEM
PURCHASING AGENT
REQ'N. No. _____
PLEASE FURNISH THE FOLLOWING MATERIAL AT _____ 19____
SHIP CARE OF _____
SUB REQUISITION REFERENCE | QUANTITY: ON HAND, DUE, USE MONTHLY, TO BE ORDERED | UNIT | DESCRIPTION — PURPOSE FOR WHICH MATERIAL REQUIRED TO BE GIVEN UNDER THIS HEADING | FOR PURCHASING DEPT. ONLY

Forms 4405, 4405A and 4405B Prepared by Stores When Ordering Material from Purchasing Department
Four Copies of 4405 and One Copy of Each of the Other Two Forms are Prepared in One Operation, One Copy of Form 4405 and 4405B Becoming Purchasing Department Records.

from another district store, the procedure becomes more involved. In such cases, a combined order and invoice is prepared, consisting of six copies of a form 7 in. high and 8 in. wide and numbered consecutively from 1 to 6. The original store must report the quantity of each item on hand, the quantity due and the average monthly consumption, as well as the quantity and description of each item of material required. The first five copies are then forwarded to the district store on which the order is drawn. At this store, copy No. 5 is marked to show whether the material is to be supplied from stock or ordered on the purchasing department for direct shipment to the originating store. This copy is then detached and given to the requisition clerk for the preparation of an order on the purchasing agent, if required, and it then becomes an office copy. The remaining copies go to the proper sectional stockkeeper, who prepares the material for shipment. The manner in which material is packed is marked in spaces on the back of copy No. 4 for biller's reference, while the unit prices of the materials, as well as the car numbers, are marked on the front of all four copies. Copy No. 4 is then filed in the office with copy No. 5 which had already been placed in the hands of the requisition clerk. Copy No. 3 is then forwarded to the originating store as a notice of shipment, and copies No. 1 and No. 2 go to the accountant, who extends the prices, after which he retains copy No. 2 and forwards copy No. 1, the original order, to the originating store to serve as an invoice.

Orders to Purchase

When purchasing becomes necessary, either to replenish the stores stock or to fill orders received from other stores or from users, another set of forms is used. These requisitions originate with the district stores in all cases and are designed to produce several records at one writing. The general storekeeper's office writes no purchasing requisitions except in emergencies. Each requisition prepared for standard material for all routine work comprises three separate forms, Form 4405, 8 in. high and 10 in. wide, which is prepared in quadruplicate, and one copy, each, of Form 4405A and Form 4405B, which are 8 in. high and 15 in. wide. Thus, each purchase requisition comprises six copies.

Forms are all typed at one time at the district store to show the requisition number, the consignee, and the description and purpose of each item ordered, together with the quantity of each item on hand and due, the quantity used monthly, and also the number of the requisition, if any, from which the purchase order was made. The requisition number is a collective number indicating the month, the material classification number, the storehouse and the number of the requisition.

The district storekeeper retains two copies of Form 4405 and also Form 4405A. The latter becomes a ledger record, in which is entered the quantity of each item, received, the date, car number, etc., the miscellaneous charges, the amount of the invoice, when received, the date each invoice is received, and the unit price. The remaining two copies of Form 4405 and Form 4405B are forwarded to the general storekeeper, who retains one copy of Form 4405, forwarding the remaining copy of that form to the manager of stores of the C. N. and forwarding Form 4405B direct to the regional purchasing office. This form is signed by the district storekeeper and the general storekeeper and authorizes the purchasing department to proceed with the purchase of the material. For the convenience of the purchasing department, Form 4405B provides spaces in which to enter the name of the firm authorized to supply each item, the unit price, the delivery date specified, the f.o.b. point, the tax, the terms of the contract, and the inspection required.

A similar routine is followed in purchasing special material or material required for work requiring special authority, except that the original of Form 4405 and also Form 4405B, which finally reach the purchasing agent, are printed on yellow stock to identify them from the purchase orders placed for standard routine material. The entire scheme is adapted to provide all records at one writing and to facilitate the desired supervision over purchasing without requiring any transcribing or without delaying the movement of the original order from the district store to the purchasing department.

The above forms do not provide for all the contingencies that arise in material procurement, however. When one store orders material on another storehouse under the transfer system described, it occasionally occurs that the entire order cannot be filled. In such cases, the store handling the order takes steps to obtain the material by purchase or other prescribed means unless the missing material is already due on requisitions issued

previously, but, in either case, the situation requires a back order, so called, which is filled out to show the required material and then filed until the missing material arrives.

This form is 5 in. high and 8 in. wide and is prepared in quadruplicate. Only one item of material is abstracted on this form. All four copies are kept by the proper section stockkeeper and when the material is received, the unit price is applied by the stockkeeper and the order initialed by the shipper of the material. Copy No. 1 and copy No. 2 then go to the accountant who retains copy No. 2 and forwards copy No. 1 as an invoice to the originating store. In the meantime copy No. 3 is mailed direct to the consignee as a shipping notice, while copy No. 4 is retained at the district store where it is attached to the order drawn on the store for the material.

Shop Orders

Some of the material required for stock or ordered by users is not purchased, but obtained by orders on the local shop. In such cases, another form is required. Four copies of this order are made by folding a single form. A separate form is made on the shop for each size or variety of material, except in the case of standing orders or orders for bolts, rivets, etc. Each copy, when completed, besides showing the consignee, the requisition maker, the date issued and the date completed, shows the charges for labor, material, the sales tax, the total cost and the unit cost. The original and one copy are sent to the shop superintendent, who returns the copy when the work is completed. One copy goes to the stores accountant who keeps a record of each charge for labor and material in columns printed on the reverse side. The last copy is retained at the store. When the material is received at the store, a receipt is given for the material on a form of similar size. The unit price of the material is computed by the stores accountant and is then passed to the price clerk of the stores for posting on the shelf cards for use in pricing all orders received for the shop-made material.

The method by which the stores are billed for material obtained by transfer from other stores or by purchase orders has been described. If company material should be shipped to outside persons from the stores, another form, prepared in triplicate, is used. This form shows the unit price of the material and the total cost. One copy goes to the accountant to prepare bills collectable, the second copy goes to the consignee with a copy of the bill of lading and express receipt, and the third copy becomes an office copy.

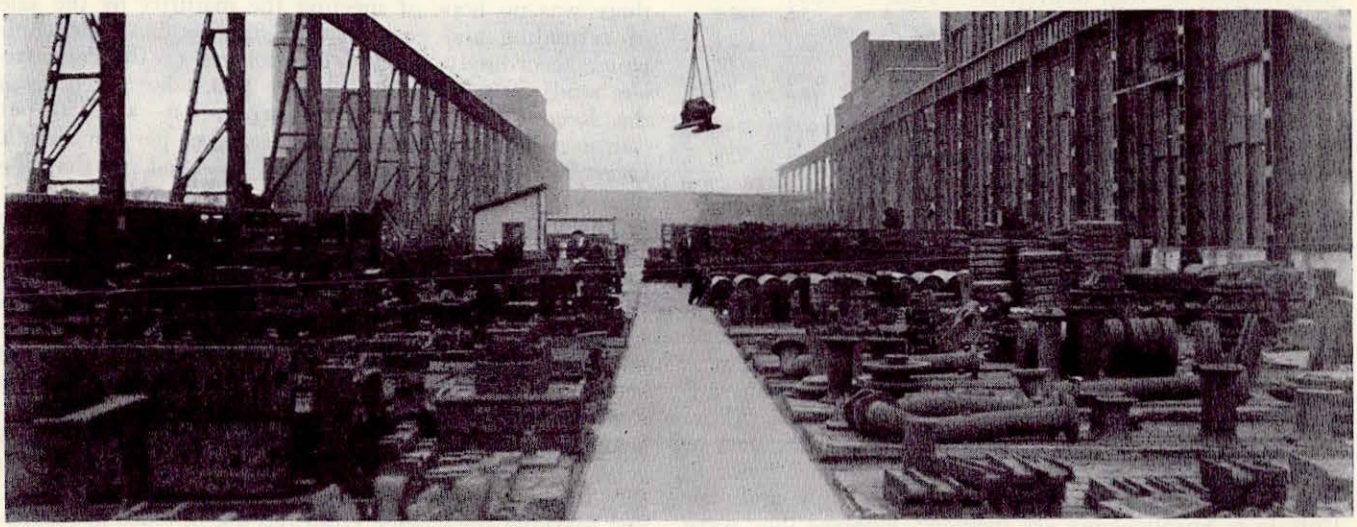
The remaining forms which enter into the G. T. W. stores operations include a surplus material statement and a statement of reclamation-plant operations. The stock-record system of this road is especially designed to disclose the presence of surplus material, and each order for material is also designed to afford a check against ordering any material in excess of needs. To supplement this arrangement and to facilitate the disposal of surpluses which accumulate, a monthly statement is prepared at each store, giving the pattern number of each surplus item, the quantity on hand and the quantity used on the basis of six months' consumption. This form is prepared for the general storekeeper in quadruplicate and is considered in checking all orders received for materials.

A monthly statement of scrap-plant operations shows the total pay-roll and the labor distribution for unloading, assorting, special cutting, handling serviceable material found in scrap and repairing scrap-handling machinery. It also gives the cost of fuel, tools, supplies, etc., used, and furnishes a record of the tons of scrap on hand at the first of the month, the tonnage received, the tons shipped, the tons sold but not shipped, and the computed cost per ton for handling.

The monthly statement of reclamation-plant operations itemizes the materials by classes, the value of scrap used, the value of the new material used, and the separate charges for labor, supervision and miscellaneous shop expense. The total and unit costs of each class of work are shown, and these, subtracted from the reported cost of new materials, give the saving.

Another form is prepared by the stores to show the condition of each automobile and tractor in use, giving consideration to the condition of the motor, the brakes, steering wheel, the condition of the wheels, the tires, the lighting system and reporting any recommendations in the interests of economy and safety.

The forms used by store inspectors are especially distinctive in that they comprise a printed questionnaire prescribing 95 questions relating to the condition of office work, the status of requisitions, the condition of the accounts, the physical condition of storehouses and surroundings, and the amount of the certain-exchange materials on hand, surplus stocks, manufacturer's materials, etc. This report gives the general storekeeper or stores manager a complete and specific picture of the condition at each store inspected.



Under the Traveling Crane at the Grand Trunk Store at Battle Creek, Mich.

Baltimore & Ohio Shows Great Improvement

THE Baltimore & Ohio in May of this year had net railway operating income of $2,252,817. After including other income and making deductions for fixed charges, the result was a net income deficit for the month of $175,556, which may be compared with a net deficit of $1,078,159 for May, 1932. In June of this year, however, net railway operating income totaled $3,495,529, an increase of 55 per cent over the preceding month and more than sufficient to overcome the small net deficit in May. The Baltimore & Ohio, then, has definitely crossed the line and is once more operating "in the black." Net railway operating income in June this year was almost 64 per cent greater than June last year, and total operating revenues of the month were 14½ per cent greater than a year ago.

With the revival in traffic the company is increasing its expenditures for maintenance. In June this year maintenance of way expenses were increased 16 per cent over those of June, 1933, and the outlays for maintenance of equipment were 8 per cent greater. Transportation expenses, by contrast, were less in June this year than they were a year ago in spite of a material traffic increase.

In Table I revenues and expenses for the company are given, comparing 1932 results with those of 1929. These comparisons, as well as those of operating statistics in Table II, can not be taken as fully significant since in 1932 the Buffalo, Rochester & Pittsburgh and the Buffalo & Susquehanna are included, whereas they were not in 1929. A decline of 48.7 per cent in operating revenues, it will be noted, was countered with a reduction of 49.2 per cent in expenses, and the operating ratio in 1932 was actually more favorable than in 1929. The lag of tax decreases behind those in the revenues from which they must be made is worthy of notice. The increase in deductions from gross income occurred largely in increased interest charges and in greater losses in the operations of separately operated properties.

Table I—Baltimore & Ohio—Selected Items of Revenues and Expenses—1932 and 1929 Compared

	1932	1929	+ Increase or − Decrease Per Cent
Miles of Line Operated	6,308	5,527	+14.1
Freight Revenues	$106,060,060	$205,489,402	−48.4
Passenger Revenues	10,362,683	22,138,626	−53.2
Total Operating Revenues	125,882,823	245,418,776	−48.7
Maintenance of Way Expenses	10,317,521	29,418,140	−64.9
Maintenance of Equipment Expenses	22,157,472	51,765,468	−57.2
Transportation Expenses	46,343,122	82,958,812	−44.1
Total Operating Expenses	91,654,935	180,570,034	−49.2
Net Revenue from Railway Operations	34,227,888	64,848,741	−47.2
Operating Ratio (per cent)	72.81	73.58	−1.0
Taxes	$8,905,017	$11,965,798	−25.6
Net Railway Operating Income	21,973,397	49,184,109	−55.3
Other Income	6,578,828	8,427,835	−21.9
Gross Income	28,552,226	57,611,945	−50.4
Deductions from Gross Income	34,887,205	28,844,037	+21.0
Net Income	*6,334,978	28,767,908	−122.0

* Deficit.

Table II—Baltimore & Ohio—Selected Operating Statistics—1932 and 1929 Compared

	1932	1929	+ Increase or − Decrease Per Cent
Revenue Ton-Miles (thousands)	10,736,739	20,657,869	−48.0
Average Haul per Ton (miles)	197.6	190.2	+3.9
Average Revenue per Ton-Mile (cents)	0.988	0.995	−0.7
Average Revenue Tons per Car	26.47	29.00	−8.7
Average Revenue Tons per Train	724.8	871.9	−16.9
Per Cent Loaded to Total Car Miles	59.2	61.4	−3.6
Average Freight Train Speed (m.p.h.)	13.3	11.5	+15.7
Gross Ton-Miles per Train Hour	24,237	23,073	+5.0
Per Cent Freight Cars Unserviceable	11.8	5.7	+107.0
Per Cent Freight Locomotives Unserviceable	38.0	16.1	+136.1
Lb. of Coal per 1000 Gross Ton-Miles	150	147	+2.1
Passenger-Miles (thousands)	428,278	728,586	−41.2
Average Passenger Journey (miles)	113.0	80.6	+40.1
Average Revenue per Passenger-Mile (cents)	2.420	3.039	−20.4
Average Number of Passengers per Train	32	42	−23.8
*Passenger Revenue per Train-Mile	$0.773	$1.286	−39.9

* Excludes mail and express revenue.

In Table I revenues and expenses for the company are given, comparing 1932 results with those of 1929. These comparisons, as well as those of operating statistics in Table II, can not be taken as fully significant since in 1932 the Buffalo, Rochester & Pittsburgh and the Buffalo & Susquehanna are included, whereas they were not in 1929. A decline of 48.7 per cent in operating revenues, it will be noted, was countered with a reduction of 49.2 per cent in expenses, and the operating ratio in 1932 was actually more favorable than in 1929. The lag of tax decreases behind those in the revenues from which they must be made is worthy of notice. The increase in deductions from gross income occurred largely in increased interest charges and in greater losses in the operations of separately operated properties.

The decline in the volume of freight traffic—48 per cent—was almost identical with that in freight revenue. The volume decline in passenger traffic was not so great but that in revenue was greater, because of a reduction in the average rate per mile. The reduction in the average tons per car and per train was very moderate, considering the decline in traffic and the necessity under such conditions of operating trains at less than capacity loads in order to maintain a high quality of service to patrons. Largely because of an increase in average train speed, gross ton-miles per train-hour showed a substantial improvement. There was a slight increase in fuel consumption per 1000 gross ton-miles, which could be expected in view of lighter loading of cars and trains, increased train speed and a rise in the percentage of empty car-miles to total. The increase in the average haul of both passenger and freight is significant, undoubtedly reflecting a further diversion of the shorter-haul business to highway competitors.

The profitability of the road's passenger service, it would appear from Table II, has suffered seriously in the three-year period. Revenues from passengers alone, excluding mail and express revenue, fell off from $1.286 per train-mile in 1929 to 77.3 cents in 1932, a reduction of almost 40 per cent. The number of passengers per train declined from 42 to 32 in the same intervening period. That this situation is receiving the closest possible attention no one can doubt. The company was a pioneer in air conditioning and in lower dining car prices and the vigor of its passenger traffic policies are everywhere recognized. The road is participating in the heavy traffic to the Century of Progress Exposition at Chicago and it is to be hoped that passenger traffic volume will soon once more be on the upgrade.

The company this year completed a refinancing operation of considerable magnitude. It had a maturity of $63,250,000 of convertible 4½ per cent bonds on March 1. These bonds were secured by the refunding and general mortgage, bonds issued under which were in reserve to more than an amount sufficient to retire the convertible issue upon maturity. Because of the great decrease in security prices, however, it appeared that there was no hope of meeting the maturity by the sale of refunding and general mortgage bonds. The company, accordingly, offered the holders of the convertible bonds 50 per cent in cash—which it borrowed from the Reconstruction Finance Corporation—and 50 per cent in refunding and general mortgage 5 per cent bonds. Over 98 per cent of the holders assented, so that the plan was an entire success.

The company increased its holdings of stock in the Reading, which is assigned to it in the four-system consolidation plan. This latter company controls the Central of New Jersey and the operations of the two systems are being increasingly integrated. The Buffalo & Susquehanna and the Buffalo, Rochester & Pittsburgh have been operated as integral parts of the Baltimore & Ohio since the latter part of 1931. Altogether, it would appear that the road is moving forward definitely toward better days, and there is no more important milestone on this journey than the one it has just passed, namely, that marking the change from red ink to black in recording the net income account.

Communications . . .

"The Fastest of Fast Runs"

STURGIS, MICH.

TO THE EDITOR:

I was greatly interested to see, on page 24 of the July 1 issue of the *Railway Age,* a picture of Lake Shore & Michigan Southern Railway locomotive No. 599, "A Locomotive Exhibited at Chicago in 1893."

As far as I know, this engine was never exhibited at Chicago. Never-the-less, it played an important part during the World's Fair in 1893, being one of five engines built by the Brooks Locomotive Works for the express purpose of hauling the "Exposition Flyer" between Buffalo and Chicago, which train made the run between New York and Chicago in just twenty hours, which, until a few months ago, was the schedule of the "20th Century." These engines weighed 104,000 lb., had 17 in. by 24 in. cylinders, 72 in. drivers and a boiler pressure of 180 lb.

On October 24, 1895, four of these engines participated in what was called "The Fastest of Fast Runs", when the Lake Shore ran a special train from 100th Street, Chicago, to Buffalo to establish a speed record. The fastest part of this run was made by a Brooks ten wheeler, No. 564, weighing 118,000 lb., with 17 in. by 24 in. cylinders and 68 in. drivers. The 86 miles from Erie to Buffalo was made in 70 minutes and 46 seconds. Eight consecutive miles were covered at the rate of 85.44 miles per hour; 33 consecutive miles at the rate of 80.6 miles per hour, and 86 consecutive miles at the rate of 72.92 miles per hour, while the maximum speed attained was 92.3 miles per hour.

CHARLES D. WRIGHT.

Why Not Make Some Fare Concessions to Regular Patrons?

WASHINGTON, D. C.

TO THE EDITOR:

With regard to the present discussion of passenger fares, perhaps a word from a user of passenger transportation, who has never been connected with any railroad company, may be of interest.

The present tendency is for the railroads to offer all kinds of inducements to the casual excursionist who travels for his own pleasure or whim, and at the same time to make no concession to the regular, steady customer who travels on business or necessity. The aim of this policy seems to be to secure the business of the man who travels once a year but to let the man who travels once a week strictly alone. The result is that most of our people now use the railroad for occasional, sporadic trips but drive their own automobiles for regular business trips.

For instance there are many persons who must make periodic trips between Washington, D. C., and New York. Most of these trips are made on full business days, namely Monday to Friday. The minimum fare for the round trip by rail is $16.34. However, the sightseer who wants to spend a few hours on Sunday at his destination can make the round trip for just $3.50. Why are the railroads so much more anxious to haul the sightseer than the man who travels on a definite errand?

The writer recently made a swing through the Southeastern states. For that portion of the trip which was made by rail the fare was 3.6 cents per mile. However, every station was placarded with announcements that the excursionist who wanted to ride around on the Fourth of July or Labor Day could do so for one cent per mile.

I suppose the answer to this is that the railroads assume that the business man must travel anyway and they can charge him anything they wish and he must pay. I think that a glance at recent statistics will prove this assumption is a mistake. This policy has driven what was formerly the most profitable class of passenger traffic away from the rails over the highway or airplane.

Is it not time that some attention was paid to the bread-and-butter passenger business?

PAUL H. CAMP.

Constructive Criticism of Passenger Service and Rates

TO THE EDITOR:

The letter of Carl V. Wisner in your June 3 issue stresses a point which cannot apparently be emphasized too heavily nor too often, judging from experiences of travelers even in these latter days of 1933. The railroads' monopoly of transport is ended, but many railroad men don't know how to act under the new conditions which require salesmanship, and as a railroad bondholder (I was frightened out of stock ownership some time ago) it has me concerned.

For example, the railroad station in a good sized town of which I know has five ticket windows. At all but one of these windows are sold the motor coach tickets of the railroad's subsidiary, but there is no sign over the one window lacking this accommodation to indicate it. As a result, people who are in a hurry to get a coach ticket wait their turn in line at the wrong window, only to get there and find that they must start all over again at another window, losing their turn, and causing considerable irritation as well as possible loss of their connection. My father, having gone through this experience, as well as having seen others do the same, went to the trouble of writing to headquarters suggesting that a sign or signs indicating where motor coach tickets were available would be helpful to the traveling public, as well as prevent unnecessary irritation. A gentleman from the railroad called on my father and explained that it was against the railroad's policy thus to encourage the sale of bus tickets because somebody who had intended to travel by train might thus be led to change his mind.

Twenty-five years ago, as a kid, I remember the railroad running time from New York and my town used to be two hours, six minutes, on the best trains, with old American type engines and twelve to fourteen cars. Now, with seven or eight cars, and the latest motive power, the best that can be done (on only one or two out of fifteen trains) is two hours, twelve minutes. As a result, business men use automobiles. Women are doing their shopping that way. I don't do it, but the round trip fare is $5.50 for a distance of 91 miles, and there are plenty, in these days of fast automobiles and not-so-fast trains, who prefer their cars, all things considered.

The railroads—and I—can show figures that prove they lose money, but that doesn't fill the passenger coaches. The eastern railroads argue, and perhaps rightly, that a real fare reduction would not yield a compensating amount of new traffic, but what it seems to me they overlook is that they are getting people out of the habit of thinking of the railroad as a means of transportation. They dismiss the rails from consideration many times when it would be more economical, because they think "railroad fare is too high for me." I have recently run into a number of the younger generation (married) to whom riding on the railroad would be an event. Actually some of them have not been on a train a half a dozen times in their lives.

If the railroads, all of them, could only review their policies, such as the ticket window policy first mentioned, with an eye to pleasing the customer, the continued decrease in passenger revenue (in my part of the country right in the face of increased freight receipts) would soon reverse itself.

The advertising department does the best it can with the limited funds at its disposal, and a very good job it does, too, but the old monopoly tradition in the operating departments gives the customer two swift kicks for every kiss that the advertising men can bestow. I am not a railroad man, but I use the rails in preference to other means of travel as far as the railroads will let me, and I admire them for many qualities, including their progress in many directions. But, if the passenger business is to be saved, fast work will be necessary. Empty trains mean removals from the schedule, which in turn require greater use of private automobiles, and thus the vicious circle continues. It is a question of selling, and a question of price; and salesmanship (which includes overhauls of general policies, not just pecking at minor employees, who can't change the rules) is the greatest part of it.

G. A. SNOW.

Odds and Ends . . .

Illinois Central Honored

If we are to believe an Associated Press dispatch from Clarkesburg, W. Va., the Illinois Central has a namesake in that town. He is Illinois Central Wilson and he makes his living as a waiter in the Clarkesburg hotel.

Snake Story

When section men of the Pere Marquette went to a point west of Mulliken, Mich., recently to investigate a clogged culvert under the main line, they expected to find a mass of sticks and stones. Instead, they found a large and squirming family of blue racer snakes, some of them of good size, which completely filled the aperture.

K. C. S. Freight Service Praised

The freight service of the Kansas City Southern was paid a sort of left-handed compliment recently by an itinerant gentleman who told a newspaper reporter that he had made the trip from Port Arthur, Tex., to Chicago and back, taking about four weeks in all, on an expenditure of $2. Naturally he travelled by Kansas City Southern freight trains to Kansas City, and he was warm in his praise of the speed with which he was moved from starting point to destination. "I made nearly passenger time on the road," he said.

Final Test for Train Announcers

A new station on a branch railway in South India has a name, which, we believe, would prove well beyond the capacity of any train announcer in this country. It seems that two villages, Adikalapuram and Veerapandiyanpatnam are equi-distant from this station, and each one claimed that its mouth-filling name should be used. As a compromise, the suggestion was made that the names of both villages should be given the station, and it is now printed in the time tables—presumably in considerably abbreviated form—as Adikalapuram-cum-Veerapandiyanpatnam. Newspaper reports state that there are 34 letters in this station name, but it is far too hot for this department to check up and make sure.

Per Diem Saved is Per Diem Earned

The operating department of the St. Louis-San Francisco is continuing to bounce foreign equipment off of its lines about as fast as it arrives. For example, 17 cars of cattle, loaded in Texas & Pacific stock cars, were received from the Gulf, Colorado & Santa Fe at Brownwood, Tex., at 12:38 p. m. on May 21. The cars were moved by the Frisco to Lightner, Tex., where they were unloaded and the cars returned to Brownwood and delivered back to the G. C. & S. F. at 9:10 p. m. the same day, without incurring any per diem while on Frisco rails. In another instance, 11 cars of cattle loaded in foreign equipment were received from the Southern Pacific at Ft. Worth at 7:00 a. m. on May 29. These cars were moved to Tolar and unloaded and the empties returned to Ft. Worth and delivered to the Southern Pacific at 5:00 p. m. the same day. Again, no per diem as far as the Frisco was concerned.

Moving Problem Solved

A. G. Crepon, locomotive engineer on the Missouri-Kansas-Texas, is probably the only member of his craft in the country who moves from one extra board call to another in his own house. Formerly on a regular run, slack business forced Mr. Crepon to the extra board, which necessitated considerable moving from one terminal to another. Each new assignment meant breaking up housekeeping and starting all over again in another place. Several months ago, however, when Mr. Crepon and his wife were preparing to make their third move in a month, a friend jokingly suggested that they should have their home on wheels. Mr. Crepon pondered the statement and finally decided it wasn't such a bad idea after all. The next day he purchased a truck body and began to erect his new "permanent" home. Two months were required for its construction, but when it was completed the Crepons had a rolling home consisting of bedroom, bathroom, kitchen and porch. The next order to move to another terminal found the Crepons ready. They moved into their portable home, filled the gas tank, and away they went.

Detroit's Unique Railroad

In Detroit, Mich., there is a railroad which is the only one of its kind and that railroad now has a locomotive which is likewise unique. The railroad in question is the Detroit Zoological Railroad, believed to be the only 30-in.-gage, rock-ballasted track in any zoo. The locomotive is the only diminutive one of its kind to be equipped with gas-electric drive. Automobiles and other vehicles are not permitted in Detroit's zoological park, although the exhibits are about a mile away from the main entrance. In 1931, the Detroit News offered a solution to the problem presented by the tiresome walk from the entrance to the exhibits by presenting the park with a one-and-one-half-mile miniature railway. That the service was popular is indicated by the fact that nearly a million people were carried by the little railway in 1931 and 1932, with the park open only 25 weeks of the year and with light attendance during the last 11 weeks. Originally two 40-h. p., gasoline-driven locomotives were used. They had three-speed mechanical transmissions and automobile clutches, and each pulled seven cars. Each locomotive weighed 7,000 lb. and each car seated 21 persons. Numerous clutch engagements at high engine speed proved too much for the axles, shafts, etc., however, so that it became increasingly difficult to keep the locomotives in service. To solve the problem, it was decided to use a gas-electric drive. For a new 5,000 lb. locomotive, engineers of the Continental Engine Corp., the Timken-Detroit Axle Co., the Chrysler Corp., and the General Electric Co., recommended a 60-h. p. gasoline engine with an electric transmission consisting of a G-E railway motor, generator, controller and accessories, and a single-worm drive axle. Within two months the locomotive was completed and put in service.

Traffic Problem, Argentine Style

From Howard O'Hagan, formerly publicity representative of the Canadian National at New York, and now "Jefe de Publicidad"—"Publicity Manager" to you—of the Central Argentine Railway, has come this story of a railroad problem which recently confronted his company. It seems that, two days after the death of senor Hipolito Irigoyen, twice president of the Argentine Republic and a popular figure among the masses, the traffic department of the Central Argentine was surprised to find that their railway overnight had unwillingly carried almost 300 passengers from Cordoba, 12 miles distant, to Buenos Aires without collecting a fare. The body of the dead president, following Argentine custom, was on view at the home in Buenos Aires, and special trains were run into the capitol city to accommodate the thousands from outside districts who wished to pass before the coffin of their one-time leader. The demand for accommodations on one of these specials, from Cordoba, was something with which the local railway authorities were unable to contend, and many passengers boarded the second-class coaches without tickets. At Villa Maria, an intermediate point, efforts were made to check up the train, but those within the second-class coaches locked the doors and held them against the train inspectors, making the check impossible. On arrival at Retiro station in Buenos Aires, a count of the passengers showed that there were 289 without tickets, and to make matters worse, the 289 were also without money. It looked like a pretty dismal day for the Central Argentine traffic department, but fortunately the situation was relieved by the generosity of two prominent members of the late president's political party, who effected a compromise with the railway by agreeing to pay the return fares of the unticketed mourners. Everything turned out for the best, after all, and the Central Argentine did a nice volume of business, even though part of it was on a non-revenue basis.

NEWS

National Groups Joining in Transport Discussions

Recently-organized Transportation Conference of 1933 is similar to 1919 movement

The Transportation Conference of 1933, an organization similar to the Transportation Conference of 1919, which formulated proposals for the Transportation Act of 1920, was organized in Chicago on July 18-20 when several organizations met to devise means whereby national groups directly interested in furnishing or using transportation could confer with respect to the whole problem of a national transportation policy, and endeavor to co-ordinate their thinking and unify their conclusions for submission to the public and to influence Congress.

The temporary organization setup includes Harry A. Wheeler, president of the Railway Business Association, as temporary chairman, and Professor Lewis C. Sorrell of the University of Chicago, as temporary secretary. Committees on permanent organization, further invitation, rules and procedure were named, and a special committee was created to prepare material for the consideration of the next conference, at New York on August 10.

While only fourteen organizations responded to the invitation sent out by Mr. Wheeler, the conference may ultimately include the motor group, the Chamber of Commerce of the United States, the intercoastal group, the port to port group, and shipping and labor interests.

The sessions, which will be held alternately in New York and Chicago, will provide a program which will supplement and support the President's Railroad Transportation Committee and the federal co-ordinator of transportation and his associates, by making available to them the conclusions of a widely diversified business group having vital interests in the transportation problem. The two subjects which will occupy the attention of the next conference will be the desirability of private ownership and operation of the railroads and equality of regulation of the several agencies of transportation. The organizations represented at the first session included the American Bankers Association, the American Highway Freight Association, the American Iron & Steel Institute, the American Newspaper Publishers Association, the American Short Line Railroad Association, the American Railway Association, the Association of Railway Executives, the Association of Regulated Lake Lines, the Mississippi Valley Association, the Mississippi Valley Barge Line Company, the National Association of Manufacturers, the Railway Business Association, the Security Owners' Association and the National Association of Mutual Savings Banks.

Burlington Locomotive Boiler Explodes

The engineman and fireman on the locomotive of the Ak-Sar-Ben, Chicago-Lincoln train of the Chicago, Burlington & Quincy, were killed and several persons were injured when the locomotive boiler exploded as the train was pulling into the Union station at Omaha, Neb., on July 18. A station porter was severely scalded and died in the hospital. The force of the explosion damaged several sheds and a foot bridge.

To Investigate Loss to Transferred B. & M. and Maine Central Employees

Co-ordinator Eastman has issued a special order appointing H. H. Kirby, an I. C. C. examiner, to make investigation to determine the amount of expenses and property losses of accounting employees of the Boston & Maine and the Maine Central who were transferred from Portland, Me., to Boston, Mass., and Boston to Portland in connection with a plan of consolidating accounting work of two companies and to report conclusions to the co-ordinator.

The co-ordinator held that the action was taken in carrying out the purposes of the emergency transportation act within meaning of Section 7 (d).

River and Harbor Projects in Public Works Program

A list of river and harbor improvement projects selected by the cabinet advisory board of the Public Works Administration from the list of such projects totalling $237,000,000 recommended by the War Department has been submitted by the board to the President but was returned to it on July 17 for further consideration. In all probability an allotment will be made for continuation of work toward the development of a nine-foot channel in the upper Mississippi River, it was stated at the White House.

The Public Works Administration has allotted $210,008 to the government's Alaska Railroad for reconditioning its entire system.

Henry Matson Waite, who since 1927 has been in charge of the construction of the new passenger terminal at Cincinnati as chief engineer of the Cincinnati Union Terminal Company, has been appointed deputy administrator of public works. Mr. Waite was engaged in railroad service for many years and served as deputy director general of transportation with the American Expeditionary Forces in 1918.

Ordinary Dismissals Not Covered by Emergency Act

Co-ordinator Eastman, in response to many inquiries, interprets Section 7b of Title I

Owing to the many inquiries for his interpretation of Section 7b of Title I of the Emergency Railroad Transportation Act, 1933, the Co-ordinator, Joseph B. Eastman, has issued the following statement:

Section 7b of Title I of the Emergency Railroad Transportation Act, 1933, contains restrictions on reductions in the number of employees in the service of a carrier and in their compensation "by reason of any action taken pursuant to the authority of this title." Judging from many letters which the co-ordinator has received, it seems to be a common impression among railroad employees that this paragraph of the Act protects them absolutely from dismissals or furloughs after the effective date of the Act. In the opinion of the co-ordinator this impression is not correct. It overlooks the words "by reason of any action taken pursuant to the authority of this title." The restrictions apply to any action which may be taken by the co-ordinator or the commission under authority conferred by the Act, or to action taken as the result of anything done by or through the carriers' regional co-ordinating Committees, the creation of which the Act directs. They do not apply, in the judgment of the co-ordinator, to any lawful action taken by individual carriers or by carriers jointly which does not result from any authority conferred by the Act or involve the use of any agency or mechanism which it creates.

The co-ordinator does not believe that it was the intent to prohibit or restrict voluntary economies in operation which were lawful when the Act was passed and are instituted in ordinary course of management. The general purposes of Title I of the Act are, among other things "to avoid unnecessary duplication of services and facilities * * * and to avoid other wastes and preventable expense." The Title undertakes to invoke the powers of the government and set up machinery to assist in these purposes. It was urged in support of Section 7b that the government should not use its power and authority, under existing conditions, in such a way as to lead to a further reduction in railroad employment. The restriction relates to such action as is required or impelled or induced under authority of the government through some agency or mechanism created by the new Act.

N.A.M.B.O. Proposes Code for Bus Operators

Provides for minimum wage of $15 per week—Attacks railway passenger rates

A minimum wage of $15 per week on a schedule which contemplates a work-week averaging 54 hrs. over the period of a year is among the provisions of the tentative code of fair competition for the motor bus industry which has been drafted by a special committee of the National Association of Bus Operators. The code is now being distributed to all motor carriers of passengers along with an invitation to send representatives to a discussion and ratification meeting which is to be held in Washington, D. C., on July 31.

The proposed code, after its declaration of policy to the effect that the motor bus industry is in entire sympathy with the purposes of the National Industrial Recovery Act, declares that in order to assure effective administration of the code there must be an accompanying "co-ordination of the regulation of steam railroad passenger transportation with the purpose or the declared policy of the National Industrial Recovery Administration."

"Competitive steam railroad passenger transportation," the code says in this connection, "is generally conducted at a recognized loss, at tariff rates which are unstable and unfair from a competitive standpoint and without relation to required revenues to meet operating expenses and taxes. The railroads are sustained in their financial difficulties by governmental loans not available to their competitor, the motor bus industry."

Section II of the code deals with definitions and Section III contains the "Wages and Hours of Service" provisions. Excepted from the $15 minimum wage proposal are porters, cleaners, apprentice mechanics, apprentice drivers and casual or part-time employees. From the 54-hr. yearly average work-week, supervisors, porters, watchmen, baggage checkers and janitors are excepted.

Section IV suggests that, "because of destructive rate or price cutting," all bus operators be licensed under Section 4 (b) of the National Industrial Recovery Act. A proviso is inserted, however, to the effect that all members of the N. A. M. B. O., by virtue of such membership, be granted licenses upon approval of the code; also, that such licenses be likewise issued to all non-member operators who, within 30 days after its effective date, subscribe to the code.

Section V provides for certified reports and Section VI for the filing of tariffs which latter, it is stipulated, must be observed. Section VII would forbid interstate bus operations by those who have failed to comply with state laws governing indemnity bonds and liability insurance. Section VIII would forbid motor carrier transportation agents to sell the service of any carrier which fails to comply with the code. Section IX limits ticket sales commissions to 10 per cent while Section X limits free or reduced rate transportation to employees of another carrier to that secured on request from the general office of such other carrier.

Section XI contains general traffic regulations which would require that specific routings on interline tickets be honored, provide for the prompt settlement of interline accounts, and prohibit the honoring of reclaims based on tickets that were originally routed over the lines of a carrier other than the reclaim carrier.

Section XII, embodying labor provisions, gives employees the right to organize while Section XIII outlines an employee representation plan. Concluding sections provide for modifications to the code, an administration plan, penalties for violations and a statement of policy to the effect that small operators will be adequately protected. The administrative section proposes that the N. A. M. B. O. set up a National Motor Bus Code Committee to aid the N. R. A. in administering the code.

Livestock Returned Free to 28 Kansas Counties

The free transportation of livestock into 21 counties in Kansas from feeding points to which the stock had been shipped from the same counties because of drought conditions during the last month is being granted by five railroads in Kansas because of recent rains that have revived the pastures. This action was taken as a result of a telegram addressed to the presidents of the Missouri Pacific, the Atchison, Topeka & Santa Fe, the Union Pacific and the Chicago, Rock Island & Pacific and to the receivers of the St. Louis-San Francisco by Governor A. M. Landon of Kansas. Provision for the free return of livestock had previously been made on shipments to seven other counties.

Planning Board for Public Works Announced

Organization of the Planning Board of the Federal Emergency Administration of Public Works has been announced by Secretary of the Interior Harold L. Ickes, as Public Works Administrator. The planning board will study long range effects or possibilities of public works projects from a social and economic point of view. The inquiry will concern all types of work, federal, local government and private. The board consists of: Frederic A. Delano, formerly president of the Wabash, formerly of the regional planning group of New York and a member of a number of Washington governmental boards and commissions; Wesley C. Mitchell, economist, Columbia University; Charles E. Merriam, University of Chicago; Charles Eliot, 3rd, will serve as executive secretary of the board. The board's duties under the direction of the administrator will consist of keeping in touch with all state boards and regional advisers so that the whole federal public works plan may be coordinated with an eye to future developments. The administration has also announced the appointment of ten regional advisors. Col. Henry M. Waite, deputy administrator, has been appointed a member of the special board for public works succeeding Col. George H. Spalding.

Controversy Over Efforts To Organize the Truckers

Code negotiations meeting obstacles on question of organization to represent industry

Negotiations incident to the preparation of a code of fair competition under the national industrial recovery act to govern the motor truck industry have encountered obstacles in a question as to what organization shall represent the truckers for this purpose. One organization already formed has undertaken to develop such a code but officials of the National Recovery Administration have indicated that they would prefer to deal with another organization covering all types of highway freight transportation, including both truckers for hire and owner-operators of trucks. In this connection the hope was expressed that the state truck associations might be able to form an organization to formulate a general code.

The tentative draft of a code, now being distributed to operators and associations throughout the country for consideration before drafting the final code for presentation to the National Recovery Administration, was prepared by a drafting committee appointed at a conference in Chicago, July 11 and 12. Provisions as to wages and hours of employment have not yet been determined.

This code, with few changes, is that prepared by the American Highway Freight Association after conference with the N. R. A. and presented at the meeting in Chicago at which some 300 delegates representing approximately 130 state and local associations from practically every state in the union were present. As a result of the deliberations the American Highway Freight Association was chosen as the national association to represent the for-hire truck and teams industry.

"This means the establishment of a new major national industry which has heretofore been a heterogeneous collection of local and sectional associations in a disorganized industry," according to a statement issued by the association. "It is estimated that between two and one half and three billion dollars are invested in the for-hire carrier industry of the country; composed of from 40 to 50 thousand individual operators and owners; with over half a million units of operation; and employing upward one and one-half million persons.

"It is regretted by leaders in this industry that it must be somewhat tardy in filing its code. This tardiness is not due to a lack of willingness on the part of the operators in the industry to do their share; but there was inadequate national organization and there is a great necessity in this industry for a great number of appendices to the code covering local, sectional and industrial differences throughout the country.

"It is, for instance, impossible to apply the same conditions of labor and fair practice to the local draymen, the interstate freight carrier, and the contract carriers

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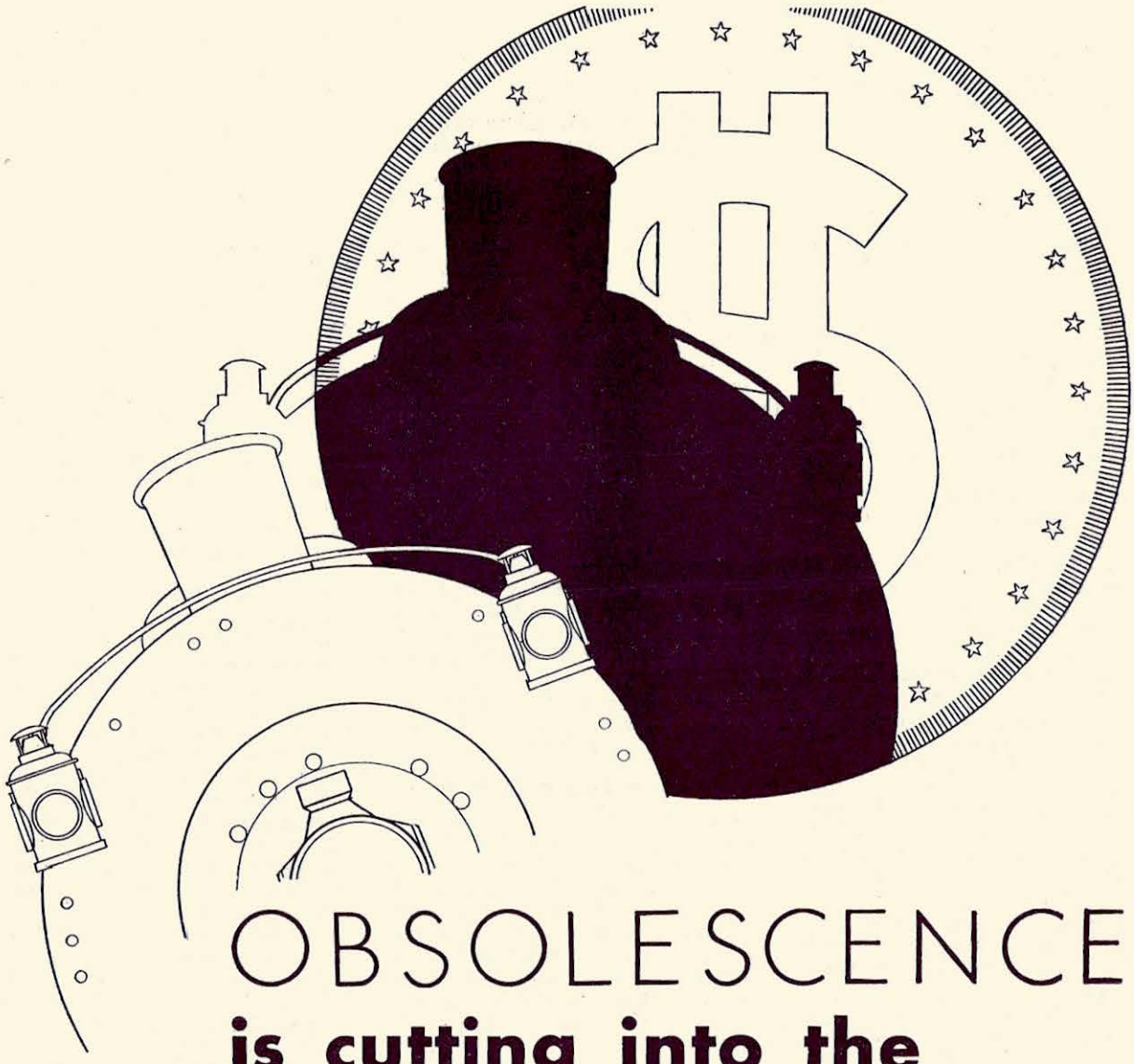

OBSOLESCENCE
is cutting into the railroad dollar

RAILROADS are manufacturers. Their product is ton miles—their production machines are locomotives.

Present tools or equipment may be physically as good as new; they may have been well maintained, but if the progress of the art has made available more productive and more economical machinery, the older equipment is obsolete.

A very high percentage of locomotives are obsolete and will pile up losses from excess cost of operation as long as they are kept in service.

LIMA LOCOMOTIVE WORKS INCORPORATED

LIMA LOCOMOTIVE WORKS • Incorporated • LIMA • OHIO

I. C. C. Suggests Recovery of W. H. Williams' Salaries

Asks Wabash receivers what is being done to recover on payments made in 1930 and 1931

The Interstate Commerce Commission has made public a letter addressed by Secretary McGinty to W. S. Franklin and W. C. Nicodemus, receivers of the Wabash, calling attention to the salaries and other payments made by the Wabash and other railways in 1930 and 1931 to the late W. H. Williams, amounting to over $353,000, and asking them to advise what, if anything, is being done or is contemplated toward recovering any part of these "extraordinary disbursements."

The letter said the commission was advised that the Wabash paid to its former president and chairman of the board of directors in 1930 a total of $183,833.36, of which amount $100,000 was for special services and the remainder was salary, and that during the same year he received additional compensation from other railroad companies as follows: As chairman of the board of the Ann Arbor, $19,666.64; as chairman of the board of the New Jersey, Indiana & Illinois, $9,833.36; as chairman of the executive committee of the Missouri Pacific, $14,583.30; as chairman of the board of the Texas & Pacific, $10,000; and as chairman of the executive committee of the Denver & Rio Grande, $6,875, a total compensation from railroad companies in 1930 of $244,791.66. Mr. Williams resigned in May, 1930, from the Missouri Pacific and Texas & Pacific after control had been obtained by the Van Sweringen interests. For the period from January 1 to October 14, 1931, the letter said, he was paid $76,002.71 as chairman of the Wabash, $21,715.05 as chairman of the Ann Arbor, and $10,857.53 as chairman of the New Jersey, Illinois & Indiana. He died on October 14. "In view of this situation and of this heavy burden which the large payments by the Wabash to one man put upon its resources when receivership was imminent," the letter said, "will you please advise what, if anything, is being done or is contemplated toward recovering any part of these extraordinary disbursements from those who authorized the payments or from the beneficiaries thereof."

A copy was sent to Judge Davis of the federal court in charge of the receivership.

Switching Rates in Chicago District Ordered Increased

The Interstate Commerce Commission has issued a report finding not unreasonable the interstate all-commodity switching rates applicable within the Chicago switching district and between the district and Chicago Heights; and finding that the intrastate switching rates in Illinois and Indiana required by the Illinois and Indiana Commissions within the switching district and between the district and Chicago Heights, which are lower than the corresponding interstate rates, result in unjust discrimination against interstate commerce. To remove the discrimination it has ordered the increase of the intrastate rates to the interstate basis on or before September 20. The interstate rates are those prescribed by the commission, largely on the basis of proposals by the carriers, effective July 31, 1931.

Court Awards Damages to Railroad in Suit Against Government

On July 11 the United States District Court at St. Paul, Minn., awarded $269,000, including $29,000 interest, to the Chicago, Burlington & Quincy for damages to the property of the railroad when the level of the Mississippi river was raised by a dam constructed by the government at Hastings, Minn. Water from the dam, which is one of 28 to be built as a part of the government's program for a nine-foot channel in the upper Mississippi, overflowed 4½ miles of the railroad's tracks, requiring the tracks to be raised an average of 3 ft.

In October, 1931, the Burlington brought suit for damages of $287,000, and after hearings three commissioners appointed by the Federal Court awarded, in January, 1932, the damages asked by the railroad. The case was then appealed to the United States District Court at St. Paul and came to trial in April, 1933. During the trial the government engaged various experts to compute the damage done by the flooding of the railroad's property, whose estimates ranged from $19,000 to $65,000.

Safety on English Railroads

The Minister of Transport has issued the report of the general inspecting officer on the accident statistics of the railways of Great Britain for 1932, and we have the notable fact that the number of passengers killed in train accidents in that year was four times greater in Great Britain than it was in the United States; *one* here and *four* there. The four deaths occurred in a single accident. Indeed, the preceding year, 1931, also showed remarkable figures; eight killed in Britain and only four in the United States. As is well known, the English railway system has long enjoyed the reputation of being the safest in the world. Since the beginning of the present century, every year except 1915—in which occurred (May 22) the terrible collision at Gretna, on the Caledonian Railway killing about 160 soldiers—has recorded low totals in practically every item. However, nineteen-thirty-one and -two show remarkable records in America. The railroads have set an unprecedented passenger record which calls for the most careful attention from all concerned. Any falling short from this record in the future will very naturally lead to demands for the fullest possible explanation.

This 1932 British report as a whole shows nearly all items smaller than for 25 or 30 years. As always, the deaths and injuries to employees in train accidents totalled very small; three killed and 59 injured in 1932.

In Britain as in America "struck or run over" continues to be one of the most persistently troublesome classes, though, as recently pointed out by the Committee on Education, of the American Railway Association, the remedy for this kind of accident is simple: (1) don't step on a track unless absolutely necessary; (2) don't step on any track until you have looked both ways; if you can't see and hear, wait.

Eastern Railways Unifying N. Y. Harbor Operations

Consolidated towing and lighterage plan revealed in report on economy program

Progress in the unification of services and facilities as well as for effecting other economies in New York harbor operations was noted in a report submitted on July 21 by the General Committee-Eastern Railroads to the Eastern Presidents' Conference. This General Committee, with some change in the scope of duties, has succeeded the former Committee on Elimination of Preventable Wastes between Railroads; the former organized at the July 21 meeting without a chairman and elected, as its general secretary, D. T. Lawrence, chairman of the Trunk Line Association and of the Traffic Executive Association, Eastern Territory.

The report, which was prepared by Mr. Lawrence who had also been secretary of the preventable wastes committee, revealed, among other features of the economy program, that a plan has been evolved for consolidated towing and lighterage operations in New York harbor. This pool of marine freight-handling equipment will be directed by T. C. Mulligan who has been appointed manager with authority "to take full charge of the combined lighterage operations of all the railroads." Mr. Mulligan had, since 1925, been manager of the Central of New Jersey's Marine department. C. M. Moore, former superintendent of floating equipment of the Lehigh Valley, is assistant manager of the pooled operations.

The full text of the report follows:

"Below is a report of the actual results accomplished thus far by the Eastern railroads through their New York Harbor Operating Committee in unifying service, eliminating competitive waste and effecting other economies and improvements in harbor operations in the Metropolitan district. The committee was appointed early last October by the operating vice-presidents of the principal Eastern railroad lines and includes in its membership representatives of the Pennsylvania, New York Central, Baltimore & Ohio, Erie, Lehigh Valley, Lackawanna, New York, New Haven & Hartford and Central of New Jersey.

"Some of the principal accomplishments of the Committee, acting for the interested railroads, may be summarized as follows:

"1. *Reduction in Lighterage Costs:* Under the previous method of operation privately owned lighterage companies specialized on handling for the railroads certain commodities, such as sugar, pulpwood, hides, vegetable oils, lumber, grain and flour. It was customary also to make outside lighterage arrangements for unusually heavy lightering operations requiring derrick capacity over 75 tons. Under the co-operative plan worked out by the railroads, all of the lighterage work with minor exceptions will be handled by the railroads themselves, resulting in substantial savings.

"2. *Consolidation of Facilities:* Substantial economies as well as improved service for shippers and receivers of merchandise freight have been effected by consolidation

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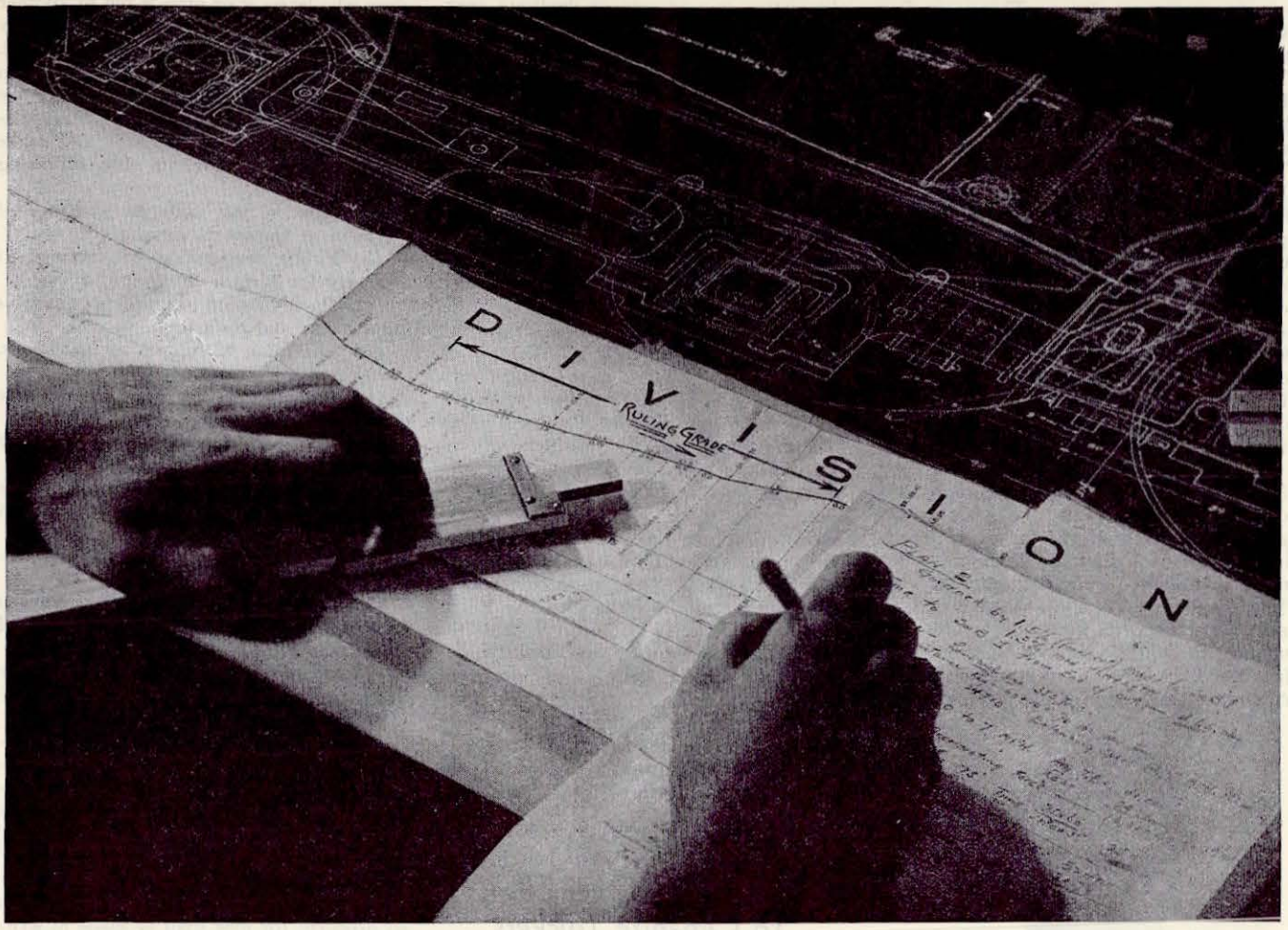
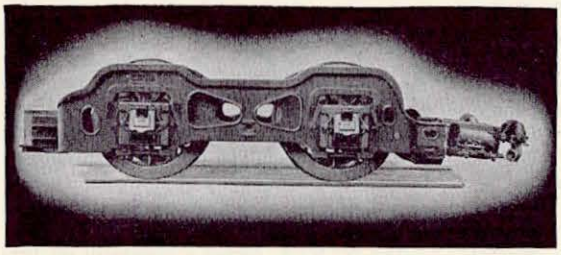


ECONOMICAL LOCOMOTIVE DESIGN

Employs The BOOSTER *For Peak Loads*

Stationary power plants design one main unit to take care of usual operating conditions and rely upon a supplementary unit for peak loads.



It is uneconomical to to operate continually a unit built big enough to take care of the maximum load. Following this principle, locomotive design should employ main cylinders large enough for normal operating requirements and use an auxiliary unit, The Locomotive Booster, for peak load conditions within the starting range.

Obtaining the desired maximum power thru a combination of main cylinders and The Booster obviously makes it possible to reduce the piston thrust of the main cylinders which in return reduces maintenance as well as lowering the weight on drivers.

FRANKLIN RAILWAY SUPPLY COMPANY, INC.

NEW YORK CHICAGO MONTREAL

of pier station facilities. This is in line with the railroads' continuing progress toward greater unification of services. The Baltimore & Ohio's station facilities at Pier 21, East river, now accommodate the business formerly handled at the Pennsylvania's Piers 22 and 25, East river. The operations formerly carried on by the Pennsylvania at Pier 2, North river, have been consolidated with Desbrosses street pier station. Similarly, the New York Central was able to consolidate at Piers 34 and 35, East river, the business formerly conducted on Pier 4, East river. At Wallabout, the Lehigh Valley and Baltimore & Ohio have arranged to consolidate their operations with the New York Central and Pennsylvania, and these two piers will be operated as a union freight station for all four railroads.

"3. *Elimination of Trucking in Lieu of Lighterage:* Due to competitive conditions over a period of years, the practice has grown up in New York Harbor of trucking in lieu of lighterage, although equipment was available for lighterage service. The committee's studies showed that in many instances it would be more economical to lighter freight instead of trucking it and the railroads, represented by the committee, have accordingly put into effect

T. C. Mulligan

plans under which the practice of trucking in lieu of lighterage will be largely eliminated. The volume of tonnage involved enables the railroads to make substantial savings.

"4. *Consolidated Towing and Lighterage:* The Committee devised and put into effect about three months ago a plan for exchanging between the railroads operating in New York Harbor their towing and marine equipment in such a way as not only to accomplish immediate economies and improved operations, but also to open up great future possibilities of still further savings. As a result of this experience, the railroads have arranged to pool their equipment and completely unify the lighterage operations of the harbor. In carrying out this plan, T. C. Mulligan has been appointed manager and has been given authority to take full charge of the combined lighterage operations of all the railroads.

"5. *Elimination of Other Competitive Practices:* The Committee is actively studying all operations for the purpose of eliminating unnecessary or duplicate practices or establishing a uniform practice for all of the interested railroads. All of these major accomplishments and other results of minor importance have been achieved with a minimum delay due to the co-operative spirit and frankness with which the interested railroads have entered into the discussion and solution of their joint problems."

Mr. Mulligan, who has been appointed manager of the pooled marine operations, was born at Upper Lehigh, Pa., on August 20, 1882, and received a high school education. He entered railway service on February 27, 1899, with the Central of New Jersey as a clerk in the supervisor's office at White Haven, Pa., and in August of the following year he became a clerk in the supervisor's office at Jersey City, N. J. He was promoted to chief clerk in the same office in 1907 and in 1914 he became chief clerk in the office of the engineer maintenance of way, with headquarters at Jersey City. In 1918, he was appointed assistant chief clerk to the general manager of the Philadelphia & Reading (now Reading Company) and the Central of New Jersey and in 1920 was promoted to chief clerk to the president and general manager of the Central of New Jersey. Mr. Mulligan became chief clerk to the general manager of the same company in 1922, and in 1925 was appointed manager of the Marine department of that road.

Controversy Over Efforts To Organize Truckers

(*Continued from page 198*)

such as milk haulers, livestock haulers or fruit and vegetable haulers. Every division of the motor carrier industry will have to have its individual section of the code and each geographical section of the country will have its own distinct place in the code.

"It is anticipated that complete national organization and consideration of the code will be had before September 15 and such organization and final preparation of a code will be completed before the date if at all possible. The American Highway Freight Association, through its offices in Washington, is doing its utmost to hasten the organization of the industry and to promote the completion of its code." Representatives of the association have been in conference on the subject with Malcolm Muir, deputy administrator of the N. R. A. Joseph B. Eastman, federal co-ordinator of transportation, has also been asked to interest himself in the matter.

According to the tentative draft of the expression "carrier of property for hire" includes such carriage not alone between places in the same or contiguous municipalities but additionally such carriage from one community or area to another. The expression also includes any carriage of property by any other industry which engages in such carriage of property for hire for others than itself. It also includes merchants hauling their own property but receiving payment for such hauling. It is also to include the owner of a truck or dray who leases it or hires it out to another industry but who retains any responsibility for the safety of the property transported.

The central committee of the industry in negotiation with the President through the National Industrial Recovery Administration is authorized to determine and make proper provisions covering the following subjects:

(a) Further provisions as to times of payment of transportation charges.

(b) Public registration of carriers of property for hire.

(c) The institution of uniform principles of accounts and accounting.

(d) The filing of reports of operations, earnings and expenses.

(e) Suitable rules in respect to insurance and bonds.

(f) Practices concerning the safety of vehicles and their operations.

(g) Provisions in respect to inspections of property, operations, and observance of the provisions of this Code.

(h) The publication, filing, and enforcement of tariffs.

(i) Rules in regard to licensing enlarged or additional operations in the carriage of property for hire.

(j) Such other matters as may arise from time to time that seem to require study or regulation under the code.

If and when rules and regulations concerning any or all of the above sub-headings shall be agreed upon between the central committee and the President such rules and regulations will thereupon constitute and become a part of the code.

A tentative specimen of appendix provides that *all agreements* for the transportation of property for hire shall be made in writing and that it shall be a violation of the code to transport any commodity for hire at less than cost or to render and perform any extra service other than such transportation at less than the cost. For the purpose of this prohibition it is proposed that any owner-operator of a truck or dray shall include as an element of his cost such a sum for his own services as would correspond to the standard wage for like service of an employee doing similar things if such things were done by an employee instead of the owner-operator. It would also be considered a violation of the code to make any discrimination in the charge as between different shippers or consignees of the same commodities which difference is not measured by differences in the costs of performing the services for the respective shippers or consignees, or "to effectuate any rebate to a shipper or consignee by means of false description of property transported, false calculations of weights, unwarranted payments as if for losses due to damage or delay of property transported, commercial bribery of any shipper or consignee or any officer or employee thereof, or by any other means or device."

The N. R. A. issued a statement on July 24 saying that there has been considerable discussion as to the way commercial users of the highways can most effectively organize to present codes of fair competition, and that operators of buses, trucks, and local transit facilities have been in conference with Deputy Administrator Macolm Muir. In reply to an inquiry Mr. Muir has stated that in considering a code

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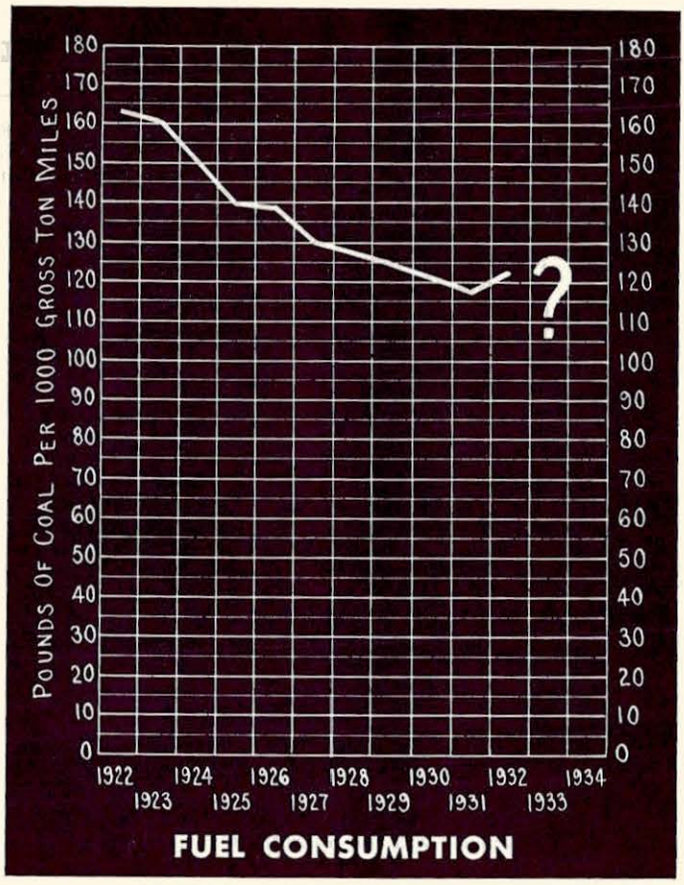


Fuel Consumption Is *Increasing!*

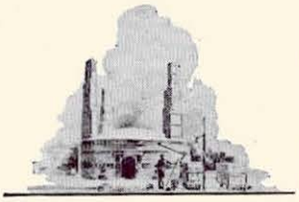
FOR years, American railroads have been rightfully proud of their record of continuous reduction in fuel consumption.

But in 1932, the reduction turned into an increase.

Many factors beyond the railroads' control affected the result. There is, however, one thing that can be done.

The railroads can be sure that full advantage is taken of all the fuel economy factors that have been so resultful in the past.

They can be sure that no locomotive is permitted to leave the shop without every Arch Brick and every course in place.



The locomotive Arch has proved its fuel economy for the past 25 years. Make full use of it now to halt the rising curve of fuel consumption.

THERE'S MORE TO SECURITY ARCHES THAN JUST BRICK

HARBISON-WALKER REFRACTORIES CO.

Refractory Specialists

AMERICAN ARCH CO.
INCORPORATED

Locomotive Combustion Specialists » » »

to cover the motor truck transportation industry such a code must be submitted by a body which is truly representative of the trucks operated in competitive hauling of freight as common carriers, contract carriers, or privately owned fleets. It is reported that such an organization is now being formed and that it will include all classes of commercial users. It is understood that the administration expects motor carriers operated by railroad subsidiaries to be included in the proposed code.

The National Highway Users' Conference is distributing copies of a letter from Mr. Muir dated July 24 including the following:

"We had hoped, and I am sure that General Johnson is in accord with me on this, that as a result of the meeting which was held in Chicago recently we would have had before this a tentative code for our inspection covering all types of highway freight transportation. When I say highway freight transportation I include the so-called for-hire groups, consisting of common carrier and contract carrier truckers, and the much larger numerical volume of privately owned trucks operating over the highways.

"We are not, of course, in a position to dictate who shall submit codes and wish to avoid any inference to that effect; but we are very hopeful that the state truck associations, which I am given to understand represent all types of users of motor trucks, will, in the near future, appoint some member from each state who will truly represent the entire motor truck field and who collectively will formulate a general motor truck code. If you can broadcast this I think that it will be truly helpful to the cause, as we can see possibilities of a situation arising where part of the highway freight transportation industry would be governed by a code which, because of competitive conditions, might be absolutely destructive to them."

In distributing this the National Highway Users' Conference stated that it would not participate in the preparation of a code; but it strongly urged that immediate steps be taken to comply with the suggestion.

Equipment and Supplies

FREIGHT CARS

THE WABASH has been authorized by Federal Judge Davis to spend up to $390,000 for the conversion and repair of box cars. The work will be done in the company's shops at Decatur, Ill.

THE UNITED FRUIT COMPANY, reported in the *Railway Age* of April 1 as having ordered 42 fruit cars of 15 tons' capacity from the Pullman-Standard Car Export Corporation, has increased this order 20 cars to a total of 62. An order for 50 additional fruit cars for Panama has also been given to the same builder.

Boston & Maine Car Repair Activities

A hundred thousand man hours of labor for approximately 200 Boston & Maine freight car repair shop workmen, who have been practically idle for the past two years, will be provided by a repair program calling for an expenditure of approximately $400,000, it was announced following a conference between representatives of the Concord, N. H. city government, the Chamber of Commerce and the railroad. The work, which calls for the rebuilding of 500 gondola coal cars of 50 tons' capacity, will start the latter part of September, just as soon as the large amount of material which the job calls for can be purchased, assembled and classified for working purposes. Determination to start the work as quickly as possible came after a series of conferences at which Mayor Robert W. Brown, representing the city, President Herbert R. Hutchinson, Secretary Joseph M. Lucier, and William H. Macurda, representing the Chamber of Commerce; Assistant to the President Laurence F. Whittemore and General Superintendent of Motive Power D. C. Reid, representing the Boston & Maine, had discussed at length the industrial situation in Concord. The Chamber officials are conducting a drive in an effort to secure more industrial activity here, and the conference with the railroad, as the city's largest industry, was marked with success in securing the freight car repair program. The railroad's repair program will bring approximately $150,000 in wages for workmen and supervisory forces to Concord, with the balance of the Boston & Maine's appropriation for the work having a widespread effect in other industries elsewhere where the orders for the steel, lumber and other materials will be placed.

Mr. Reid said that the railroad will start the actual work at the earliest possible moment but that, because of the amount of material involved it is estimated that it will be the middle of September, at least, before it can be assembled here in such form as to make for efficient operation of the repair work.

It is the railroad's intention, he said, to put through approximately six to eight cars each day, operating on a five-day basis, when the work is started. This would mean at least, he pointed out, about 14 or 15 weeks' employment for the entire force at the freight car repair shops on this one project alone.

At the same time, Mr. Reid announced that the passenger car repair shops at Concord will reopen August 1, and operate with three-quarter force, staggered to work three-quarters time in August. This will provide employment for about 220 men in the passenger car shops.

MACHINERY AND TOOLS

THE NEW YORK CENTRAL has placed orders for six 300-ampere arc welders for building up frogs and crossings on location. The orders were evenly divided among the General Electric Company, the Lincoln Electric Company and the Westinghouse Electric & Manufacturing Company.

Supply Trade

George L. Draffan, secretary of the **Ohio Brass Company,** Mansfield, Ohio, was elected vice-president of that company and its subsidiaries, at a meeting of the board of directors on June 28. Mr. Draffan

George L. Draffan

has been associated with the Ohio Brass Company for the past 17 years. In 1930, he was elected secretary and director of sales after having held the position of general sales manager for several years.

The International Rail Welding Corporation has been organized, with headquarters at 1514 Straus building, Chicago, to engage in the building up of rail ends, the repair of frogs, crossings and switches, and the repair and strengthening of metal bridges by the electric welding process. The officers of the company are **I. B. Tanner,** president; **G. T. Willard,** vice-president, and **F. M. Condit,** secretary.

Mr. Tanner, after serving for 12 years in various capacities in the engineering department of the Illinois Central, re-

I. B. Tanner

signed on August 1, 1917, to become general superintendent with Joseph E. Nelson & Sons Company, Chicago, general contractors specializing in railway construction, with which company he was connected until its activities were suspended about a year ago. Subsequently he was retained as a special engineer by the Missouri

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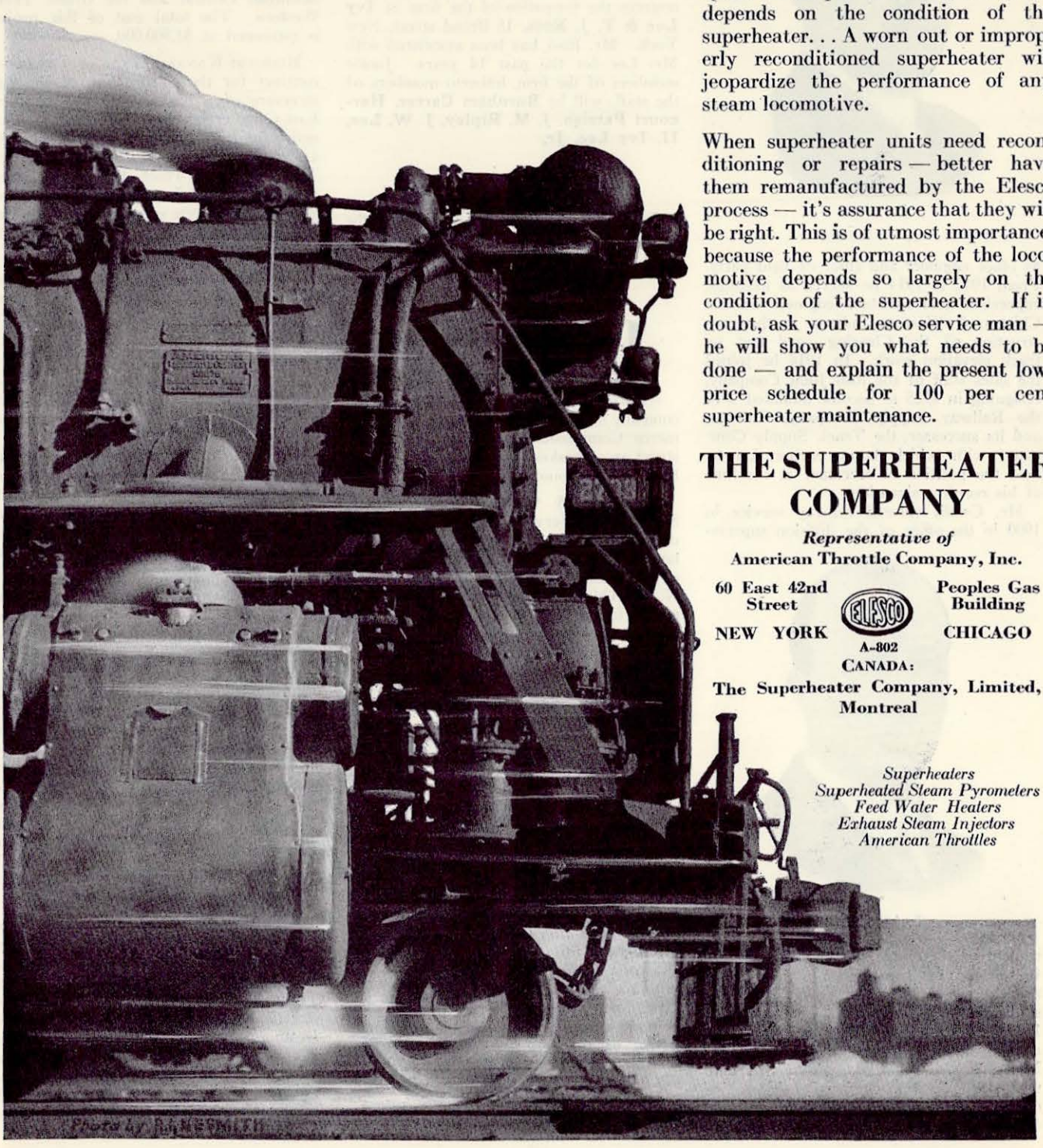
What Makes the Locomotive Go?

What makes the locomotive go?—*the driving wheels.*
What makes the driving wheels go?—*the pistons.*
What makes the pistons go?—*the superheated steam.*
What makes the superheated steam?—THE SUPERHEATER



Quite as simple as A B C, but much depends on the condition of the superheater. . . A worn out or improperly reconditioned superheater will jeopardize the performance of any steam locomotive.

When superheater units need reconditioning or repairs — better have them remanufactured by the Elesco process — it's assurance that they will be right. This is of utmost importance, because the performance of the locomotive depends so largely on the condition of the superheater. If in doubt, ask your Elesco service man — he will show you what needs to be done — and explain the present low-price schedule for 100 per cent superheater maintenance.

THE SUPERHEATER COMPANY

Representative of
American Throttle Company, Inc.

60 East 42nd Street
NEW YORK

ELESCO
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Peoples Gas Building
CHICAGO

CANADA:
The Superheater Company, Limited, Montreal

Superheaters
Superheated Steam Pyrometers
Feed Water Heaters
Exhaust Steam Injectors
American Throttles

Pacific Lines to investigate means for effecting economies in operation and maintenance on that property.

Mr. Willard was born in Topeka, Kan., in 1889 and was educated at Washburn College in that city. In 1908 he entered the employ of the Atchison, Topeka & Santa Fe, and, after serving as a chainman, rodman and inspector, he joined the engineering staff of the Kansas City Terminal Railway in 1910 as a draftsman and later

G. T. Willard

as office engineer and chief of field party. From 1912 to 1914 he served as assistant supervisor and assistant engineer on the Chicago & Western Indiana in the construction of the Clearing yard and on track elevation work. In 1914 he joined the sales staff of the Rail Joint Company, resigning in 1925 to become affiliated with the Railway Supply Company, Chicago, and its successor, the Track Supply Company, with which latter corporation he held the position of secretary at the time of his recent resignation.

Mr. Condit entered railway service in 1900 in the office of the division superin-

F. M. Condit

tendent of the Illinois Central at Chicago. In 1903 he was transferred to the staff of the vice-president of the Yazoo & Mississippi Valley at Memphis, Tenn., and in 1906 he left railway service to enter the railway sales organization of Fairbanks, Morse & Co., Chicago. From that date until 1932 he held various positions, including those of manager of the railroad department, manager of the Chicago branch house and, most recently, district manager of the railroad division. For the past year he has been a member of the sales organization of the Track Supply Company, Chicago.

Winthrop W. Aldrich, president of the Chase National Bank, has been elected a director of the **Westinghouse Electric & Manufacturing Company.**

E. E. Adams, vice-president of the Union Pacific System, with headquarters at Omaha, Neb., has been appointed vice-president of Pullman, Incorporated, in charge of the newly established research department especially concerned with development of transportation equipment.

Ivy Lee, public relations counsel, announces the formation of the firm of **Ivy Lee & T. J. Ross,** 15 Broad street, New York. Mr. Ross has been associated with Mr. Lee for the past 14 years. Junior members of the firm, hitherto members of the staff, will be **Burnham Carter, Harcourt Parrish, J. M. Ripley, J. W. Lee, II, Ivy Lee, Jr.**

OBITUARY

Judson A. Lamon, vice-president of the McCord Manufacturing Company, died on June 20.

Construction

ATCHISON, TOPEKA & SANTA FE.—This company has applied to the Interstate Commerce Commission for authority to construct an extension of 20 miles from Carlsbad in Eddy county, N. M.

BALTIMORE & OHIO.—The New York State Public Service Commission has ordered this road to award a contract, not later than September 1, for the elimination of the West Main street crossing in LeRoy, N. Y. This action follows an investigation of the failure of the road to comply with an order issued in February, 1932. It is estimated that the work would cost about $150,000 or less, that sum having been calculated two years ago. The company has delayed action because of financial difficulties, but the commission says that money may be borrowed from the state.

CHICAGO, INDIANAPOLIS & LOUISVILLE—This company is contemplating the construction of a highway subway to carry State Highway No. 8 under its tracks south of St. John, Ind. Present plans call for a deck girder structure on concrete piers at this location.

COOS BAY SOUTHERN.—The Interstate Commerce Commission has denied the application of this company for authority to construct a 5.5-mile line from a connection with the Southern Pacific at North Bend, Ore., to a paper mill near Empire. The commission has likewise denied an application of the company for authority to borrow $75,000 from the Reconstruction Finance Corporation to finance construction.

GRAND TRUNK WESTERN.—Contracts for the construction of two reinforced concrete and steel highway subways to carry Roosevelt and McKinley avenues, Detroit, Mich., under the tracks of this company have been awarded to W. E. Lennane, Detroit. These structures are being constructed to replace temporary wooden trestles in accordance with an agreement with the city of Detroit to the effect that the temporary trestles were to be replaced when the structures had reached the end of their service life.

GRAND TRUNK WESTERN - MICHIGAN CENTRAL.—The city of Hamtramck, Mich., is contemplating placing an application for federal aid in financing the construction of a reinforced concrete grade separation structure at Conant avenue in that city at its intersection with the tracks of the Michigan Central and the Grand Trunk Western. The total cost of this project is estimated at $1,800,000.

MISSOURI-KANSAS-TEXAS OF TEXAS.—A contract for the construction of the substructure of a highway subway to carry East Commercial street, San Antonio, Tex., under the tracks of this company has been awarded to E. L. Martin, Dallas, Tex. This structure, which has an estimated cost of $25,500 will consist of three I-beam spans on a concrete substructure. The steel for the project is to be furnished and placed by the railroad company.

NEW YORK CENTRAL.—The general contract for eliminating the grade crossing over the main line and yard tracks of this road at Corning, N. Y., has been given to William M. Ballard, Syracuse, N. Y.

PENNSYLVANIA.—A contract has been given to the Crossan Construction Company, Brownsville, Pa., for the removal of the existing bridge and construction of a new bridge on existing abutments at Main street, Gallitzin, Pa., over the eastbound main tracks of this road, together with raising and paving approaches in Main street and Portage street and the station driveway approach. The cost of the work will be about $24,500.

PENNSYLVANIA.—The New York State Public Service Commission has ordered this road to award, by September 15, a contract for elimination of grade crossings in East Aurora, N. Y., the total cost of which, as estimated a year ago, would be $1,196,000. The cost would probably be lower at the present time. The railroad has opposed proceeding with this work because of its financial condition. Local interests have urged action, though the village board of East Aurora adopted a resolution requesting that the matter be delayed one year. The crossings involved are Wilson road, one mile south of East Aurora, and the crossings at Main street, Oakwood avenue, Persons street and Olean street.

SOUTHERN PACIFIC.—The general contract for the construction of this company's passenger station at Houston, Tex., has been awarded to Nathan Wohlfeld, Dallas, Tex. The contract for the installation of electrical equipment has been let to Jacob Brothers, Houston, while the C. Wallace Plumbing Company, Dallas, has been awarded a contract for the installation of the plumbing and heating system. The total estimated cost of the contract work for this project is $1,200,000.

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AMERICAN LOCOMOTIVE CO.

FACTS PROVOKE THOUGHT—

—THOUGHT PROVOKES ACTION

In our last two advertisements, we have presented facts indicating that railroad traffic is increasing at a rapid rate. Perhaps, you have thought about these facts along the lines we have. If you have, you'll consider taking this action — TO BUY SUFFICIENT MODERN MOTIVE POWER TO MAINTAIN PRESENT DAY FAST SCHEDULES — and in this way make certain of your share of the traffic increase.

30 CHURCH ST. NEW YORK, N.Y.

Financial

BALTIMORE & OHIO.—*Notes.*—This company has applied to the Interstate Commerce Commission for authority to issue $3,000,000 three-year 5½ per cent notes to be used in payment of 60 per cent of the face amount of $5,000,000 of Cleveland, Lorain & Wheeling first mortgage 5 per cent bonds together with 40 per cent in cash.

CHICAGO & NORTH WESTERN.—*R. F. C. Loan.*—This company has applied to the Reconstruction Finance Corporation for an additional loan of $3,862,000 to assist in refinancing Fremont, Elkhorn & Missouri Valley 6 per cent consolidated mortgage bonds due October 1.

PENNSYLVANIA.—*R. F. C. Loan Repayment.*—This company has made an additional payment of $4,000,000 on its loan of $27,500,000 from the Reconstruction Finance Corporation made to complete its electrification work, leaving a balance of only $5,000,000 on this loan although there is still outstanding $1,400,000 of an additional "work loan."

ST. LOUIS-SAN FRANCISCO.—*Consolidation with Rock Island Proposed.*—The hearing before O. E. Sweet, director of the Bureau of Finance of the Interstate Commerce Commission, on a reorganization plan for this company, which was begun on July 18, was adjourned on July 19 to some time in September. C. M. Clay, counsel for the Reconstruction Finance Corporation, in a statement shortly before adjournment, said that although it might be conceded that the plan suggested to the R. F. C. last July and modified on August 29, 1932, and April 10, 1933, fulfills the commitment made at the time of the loan from the R. F. C. last summer, the R. F. C. is not of the opinion that it should now be approved and that the possibility of a consolidation of the Frisco with the Chicago, Rock Island & Pacific might well be further explored. He said the R. F. C. has been approached by the readjustment managers of the Rock Island who had suggested that they would like to prepare a plan of reorganization for the Rock Island which would include such a consolidation and that it had been informed that the chairman of the Frisco proposes to take up the question with his board and with the reorganization managers.

Average Prices of Stocks and of Bonds

	July 25	Last week	Last year
Average price of 20 representative railway stocks..	44.49	51.35	14.76
Average price of 20 representative railway bonds..	72.80	75.34	54.54

Dividends Declared

Cincinnati Inter-Terminal. — First preferred, $2.00, semi-annually, payable August 1 to holders of record July 20.

Dallas Railway & Terminal.—7 per cent preferred, $1.75, quarterly, payable August 1 to holders of record July 21.

Erie & Kalamazoo.—$2.50, payable August 1 to holders of record July 26.

Peoria & Burean Valley.—7 per cent preferred, 3½ per cent, semi-annually, payable August 10 to holders of record July 21.

York Railways.—Preferred, 62½c, quarterly, payable July 31 to holders of record July 20.

Railway Officers

EXECUTIVE

E. E. Adams, vice-president of the Union Pacific System, with headquarters at Omaha, Neb., has been appointed vice-president of Pullman, Incorporated.

Edward W. Scheer, vice-president of the Reading, in charge of operation, has also been elected vice-president in charge of operation and maintenance of the Central of New Jersey. Mr. Scheer's headquarters will be located at Reading Terminal, Philadelphia, Pa., as before. A photograph of Mr. Scheer together with a sketch of his career appeared in *Railway Age* of May 7, 1932, page 795, when he was elected to the vice-presidency of the Reading.

OPERATING

R. R. Unzicker assistant superintendent of transportation of the Southern Pacific Lines in Texas and Louisiana, has been appointed acting superintendent of transportation, undertaking the duties of **O. C. Castle.** Mr. Castle has been granted leave of absence to serve as director, section of car pooling, on the staff of Federal Coordinator Joseph B. Eastman.

F. E. Lewis, general superintendent of the Chicago, Indianapolis & Louisville, has been appointed to the newly-created position of general manager, with headquarters as before at Lafayette, Ind., and his jurisdiction has been extended to include the mechanical department. Mr. Lewis' appointment was made following the death of **W. A. Callison,** superintendent of motive power, on July 2, which was noted in the *Railway Age* of July 8.

A. T. Berg, a trainmaster on the Milwaukee division of the Chicago, Milwaukee, St. Paul & Pacific, with headquarters at Milwaukee, Wis., has been promoted to assistant superintendent of the Chicago Terminals division, with headquarters at Bensenville, Ill., to succeed **D. T. Bagnell,** who has been promoted to superintendent of the Twin City Terminals division, with headquarters at Minneapolis, Minn. Mr. Bagnell succeeds **E. H. Bannon,** who has been transferred to the Milwaukee Terminal division.

A number of divisions on the Western region of the Canadian National have been rearranged and consolidated, resulting in several changes among division superintendents. The Melville division has been consolidated with the Saskatoon division and the Craik subdivision of the latter division has been transferred to the Regina division while the Langham, Carlton and Cutknife subdivisions of the Saskatoon division have been transferred to the Prince Albert division. **E. Crawford,** superintendent of the Melville division, with headquarters at Melville, Sask., has been appointed superintendent of the enlarged Saskatoon division, with headquarters at Saskatoon, Sask. The Saskatoon division was previously under the direct supervision of **W. C. Owens,** general superintendent at Saskatoon. The Portage and Brandon divisions have been consolidated under the name of the Portage-Brandon division, and **J. J. Napier,** superintendent of the Brandon division, with headquarters at Brandon, Man., has been appointed superintendent of the enlarged division, with headquarters at Winnipeg, Man. **W. R. Devenish,** general superintendent at Winnipeg, was formerly in direct charge of the Portage division. The lines comprising the Edson division have been transferred to the Edmonton division, and **A. E. Macdonald,** superintendent of the Edson division, at Edson, Alta., has been transferred to Edmonton, Alta., as superintendent of the enlarged Edmonton division. **W. I. Munro,** general superintendent at Edmonton, formerly exercised direct supervision over the Edmonton division.

TRAFFIC

A. R. Mielly, assistant industrial commissioner of the Southern Pacific Lines in Texas and Louisiana, with headquarters at Harlingen, Tex., has been promoted to industrial commissioner, with headquarters at Houston, Tex.

W. F. Bollman, assistant general freight agent of the Baltimore & Ohio, has been appointed general freight agent, succeeding **A. L. Doggett,** promoted. Mr. Bollman will have headquarters at Pittsburgh, Pa., as before.

Pursuant to the retirement of **Eugene W. Clapp** and **Herbert A. Hinshaw,** general passenger traffic manager and general freight traffic manager, respectively, of the Southern Pacific, Pacific Lines, on August 1, and the abolition of these positions, as noted in the *Railway Age* for July 22, a number of changes have been made among the officers of the freight and traffic departments of this company.

In the freight department, **H. C. Hallmark,** assistant general freight traffic manager, has been appointed to the newly-created position of freight traffic manager in charge of rates and divisions, with headquarters as before at San Francisco, Cal., and the position of assistant general freight traffic manager has been abolished. **A. I. Hoskins,** assistant to the general freight traffic manager, has been appointed assistant freight traffic manager under Mr. Hallmark, with headquarters as before at San Francisco. **S. K. Burke,** assistant to the general freight traffic manager, at San Francisco, has been appointed assistant general freight agent, with the same headquarters. **W. W. Hale,** freight traffic manager, with headquarters at Portland, Ore., has been appointed general freight agent of the Northern district with the same headquarters, to succeed **W. F. Miller,** who has retired. **F. E. Scott,** freight traffic manager, with headquarters at Los Angeles, has been appointed general freight agent of the Southern district, with the same headquarters, to succeed **G. J. Blech,** who has been appointed assistant general freight agent at the same point. The positions of freight traffic manager at

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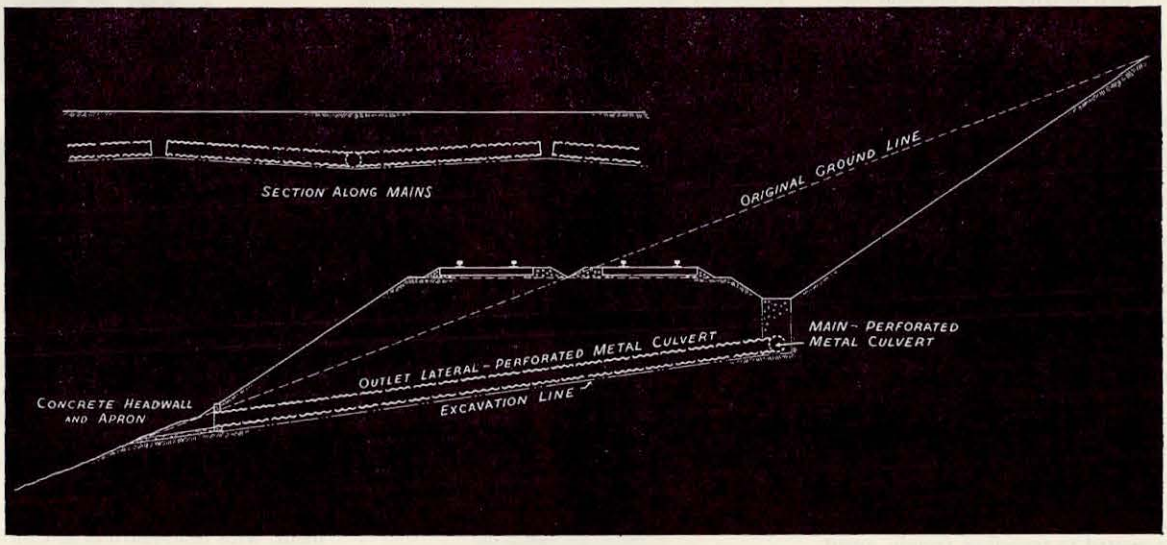
FOR SIDE-HILL DRAINAGE... USE TONCAN IRON CULVERTS



SIDE-HILL DRAINAGE

Using Perforated Metal Culvert and Back-fill of Crushed Stone, Gravel or Furnace Slag

A roadbed built upon a side-hill is very susceptible to infiltration of surface water. All surface water from the land laying upward from the tracks is caught in a single ditch to be carried away. If this ditch is not on a steep grade or if the side-hill section lies between two cuts, a large amount of water lies in the ditch paralleling the track and slowly seeps into the roadbed. The natural ground, being compact and impervious, carries the water on top of it through the fill, and offers a plane of slippage. The fill portion of the roadbed slips and caves when it becomes sufficiently saturated with water. Rebuilding the fill will not remedy the danger of it caving under passing traffic.

A trench three to five feet deep should be dug along the ditch line. Two lengths of perforated metal culvert are laid on a slight grade toward a perforated metal culvert outlet lateral. This arrangement is continued along the entire side-hill section. Where water pockets have formed, perforated laterals should be placed to drain them. Back-fill for mains and laterals may be crushed stone, gravel or furnace slag. The outlets should be provided with concrete or rubble headwalls and aprons to prevent washing away the toe of the fill.

Toncan Iron Culverts, plain and perforated, offer the ideal solution for this and other drainage problems. They are made of a long-lasting alloy of refined iron, copper and molybdenum—an alloy with a rust resistance that ranks first among the ferrous metals after the stainless alloys. Consequently, they cut down track maintenance and continue to pay dividends long after culverts of less durable materials have failed from corrosion, impact or vibration.

Tell us your drainage troubles. Our experience may save you money and worry.

TONCAN CULVERT MANUFACTURERS' ASSOCIATION

YOUNGSTOWN • OHIO

Portland and Los Angeles have been abolished.

In the passenger department, **F. E. Watson,** assistant general passenger traffic manager, has been appointed assistant to the vice-president in charge of passenger traffic, with headquarters as before at San Francisco. **J. A. Ormandy,** passenger traffic manager with headquarters at Portland, Ore., has been appointed to the newly-created position of general passenger agent of the Northern district with the same headquarters. **F. C. Lathrop,** passenger traffic manager at San Francisco, has been appointed to the newly-created position of general passenger agent of the Central district with the same headquarters. **C. L. McFaul,** passenger traffic manager with headquarters at Los Angeles, has retired, and the positions of passenger traffic manager at Portland, San Francisco and Los Angeles have been abolished. **Garnett King,** assistant passenger traffic manager at Oakland, Cal., has been appointed assistant general passenger agent with the same headquarters.

Herbert A. Hinshaw, who has retired as general freight traffic manager of the Southern Pacific, Pacific Lines, was born on September 30, 1871, at Winchester, Ind., and entered railway service in 1890, as an agent for the Southern Pacific, serving in this capacity at various points. In 1906 he was promoted to traveling freight agent, which position he held until 1911, when he was made assistant general manager of the Salem, Falls City & Western (now part of the Southern Pacific), with headquarters at Dallas, Ore. During the following year he was made general freight agent for the Southern Pacific lines in Oregon, including the Corvallis & Eastern, the Pacific Railway & Navigation Company and the Salem, Falls City & Western. In 1921 Mr. Hinshaw was further advanced to assistant freight traffic manager of the

Herbert A. Hinshaw

Northern district of the Southern Pacific, with headquarters at San Francisco, holding this position until 1929, when he was made general freight traffic manager of the Pacific Lines, which position he continued to hold until his retirement.

Eugene W. Clapp, who has retired as general passenger traffic manager of the Southern Pacific, Pacific Lines, with headquarters at San Francisco, Cal., has been connected with the traffic department of the Southern Pacific for 39 years. He was born at Memphis, Tenn., on February 25, 1874, and entered railway service in 1893 as a stenographer on the Southern Pacific at Tucson, Ariz. Three years later Mr. Clapp was appointed cashier at Lordsburg, N. M., where he later served as chief clerk and agent. In 1905, he was promoted to passenger agent at San Francisco, and a year later he was made division freight and passenger agent at Reno, Nev., later being transferred to Fresno, Cal. He was advanced to chief clerk in the general freight office at San Francisco in 1910 and in the following year he was made general freight and passenger agent of the Eastern Railroad (now part of the Southern Pacific), with headquarters at Tucson. In 1915, Mr. Clapp was promoted to general freight agent on the Southern Pacific at Los Angeles, being transferred to San Francisco four years later. In 1921, he was promoted to assistant freight traffic manager at San Francisco, which position he held until 1926, when he was transferred

Eugene W. Clapp

to Chicago as traffic manager. He has held the position of general passenger traffic manager at San Francisco since 1929.

C. L. McFaul, who has retired as passenger traffic manager of the Southern Pacific, Pacific Lines, with headquarters at Los Angeles, Cal., has been in railway service with various companies for 46 years. He first entered railway service on February 25, 1887, as a telegrapher on the Chicago, Burlington & Quincy at Clinton, Neb., being promoted to dispatcher and clerk in the office of the division superintendent at Denver, Colo., in February, 1891. From July, 1892, to July, 1899, he was engaged consecutively as a relief agent, agent, telegrapher, relief dispatcher and chief clerk to division superintendents at various points on the Southern Pacific. In July, 1899, he was appointed assistant general manager of the Nevada Central, re-entering the service of the Southern Pacific in July, 1901, where he was appointed city freight and passenger agent at San Jose, Cal., in October of the same year. Three years later he was promoted to traveling freight and passenger agent, and in September, 1906, he was made city ticket agent at San Jose. Two years later Mr. McFaul was reappointed traveling freight and passenger agent, which position he held until April, 1913, when he was made district freight and passenger agent, with headquarters at Salt Lake City, Utah. In September, 1916, Mr. McFaul was trans-

C. L. McFaul

ferred to Fresno, Cal., and during federal control of the railroads he served on the personal staff of the district director of the Central-Western region for the United States Railroad Administration. He returned to the Southern Pacific in December, 1919, as general agent in the traffic department, with headquarters at Chicago. From July to December, 1923, he occupied the position of general passenger agent, with headquarters at San Francisco, then being appointed assistant passenger traffic manager. He has been passenger traffic manager at Los Angeles since December, 1929.

MECHANICAL

Arthur H. Keys, general car foreman of the Pittsburgh division of the Baltimore & Ohio at Glenwood, Pittsburgh, Pa., has been appointed district master car builder of the Pennsylvania-New York District of the B. & O., which comprises the former Buffalo & Susquehanna and the Buffalo, Rochester & Pittsburgh, as well as the B. & O. main line from New Castle, Pa., to Cumberland, Md.

SPECIAL

E. C. Webster, special assistant to the executive vice-president of the Union Pacific, at Omaha, Neb., was elected executive secretary of the Regional Co-ordinating committee, Western Railway group, at a meeting of the committee at Chicago on July 21. This is the committee that has been chosen to represent the Western railroads in accordance with the Emergency Transportation Act of 1933. Mr. Webster, who is on leave of absence from the Union Pacific, will have his headquarters at Chicago.

OBITUARY

E. H. Pudney, electrical engineer of the Atlanta, Birmingham & Coast, died suddenly in his office at Fitzgerald, Ga., on July 12. Mr. Pudney was 54 years of age.

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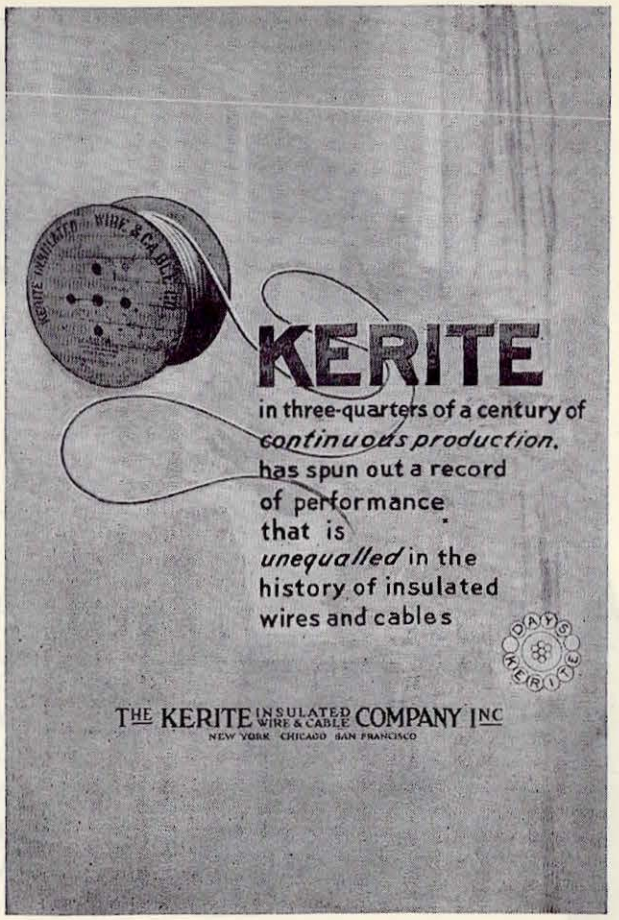

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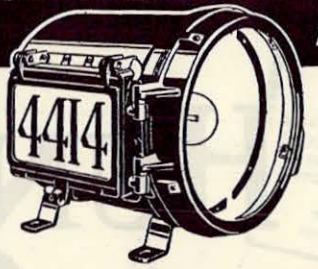

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No More Trouble

To the Editor:

In reply to "Foreman" in the January issue about cotter keys. The use of Cooke pins and cotters where pins are used would put an end to all cotter-key troubles.

A Reader.

Cotter and Split Keys

To the Editor:

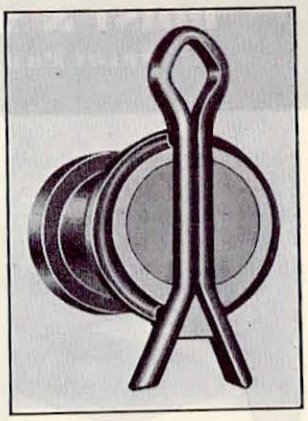
With the advent of winter, car-department men, particularly those in the northern section of the United States and in Canada, are again faced with several extra worries incidental to, and to a certain extent inseparable from, cold-weather conditions. Not the least among these extra cares is trouble with foundation-brake gears, including the dropping of brake beams, largely caused by the failures of cotters and split keys in brake-hanger pins. These failures usually result in a vigorous campaign of brake maintenance. But, unfortunately, the benefit derived from such belated attention does not give immediate relief from the trouble.

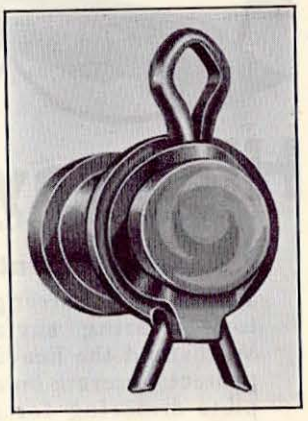
The procedure necessary to insure the best results is an intensive all-year program, particularly when cars are on repair tracks, of careful inspection of all [illegible] split [illegible] [illegible]

[illegible] due to over-bending, and fail, with the result that the key will work out. The same danger exists when both wings of a key are over-bent. Furthermore, such keys are more difficult to remove, and if re-applied after such removal, they are likely to fail. False economy is too often practiced in the reclaiming and re-using of cotter and split keys, and their re-use is justified only when they are in first-class condition. Flat split keys made of thin, easily-bent material, should not be used in brake rigging.

Car Foreman.

NO MORE TROUBLE if Westinghouse-Cooke Cotter Pins are used





THIS device—comprising collar and cotter—can be used on any standard brake pin . . . It is easily applied—collar slipped over pin, cotter inserted, given a few sharp taps with a hammer, its prongs automatically spread and doubly lock. No amount of vibration can loosen it . . . Cotter is easily driven out, is not distorted, and can be used time and again . . . . . .

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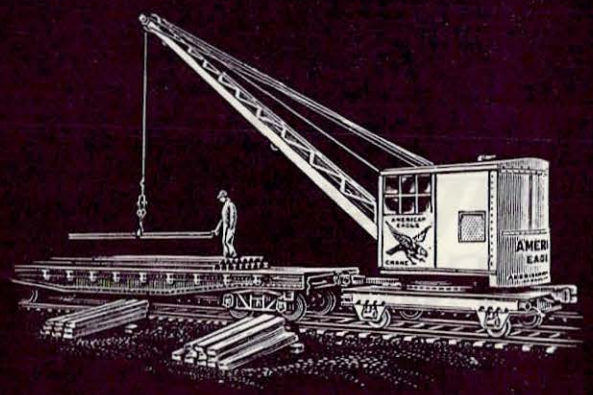

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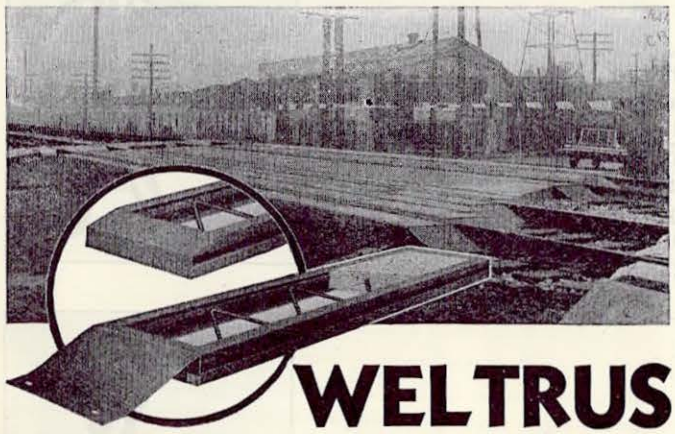

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By
John H. Frederick, Ph. D.,
Frank T. Hypps, Ph. D.,
and
James M. Herring, Ph. D.

Instructors in the Wharton School of Finance and Commerce; University of Pennsylvania

Regulation of the financial affairs of railroads by the Federal government through the Interstate Commerce Commission, under the Transportation Act of 1920, is clearly explained in this book. The various tests applied by the Commission in determining the elements of public interest to which the statute usually refers are traced, together with the nature and reasons for the Commission's action in regulating the financial affairs of the railroads.

Contents

Introduction—Certificates of Public Convenience and Necessity for Construction and Abandonment of Railroads—The Acquisition of Control of Carriers—The Recapture of Excess Earnings—The Issuance of Securities and Assumption of Obligations—Interlocking Directorates—Appendices: Provisions of the Interstate Commerce Act Administered by the Finance Bureau of the Interstate Commerce Commission — New Railroad Construction — Abandonments—Bibliography—Index.

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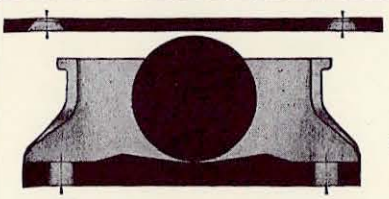

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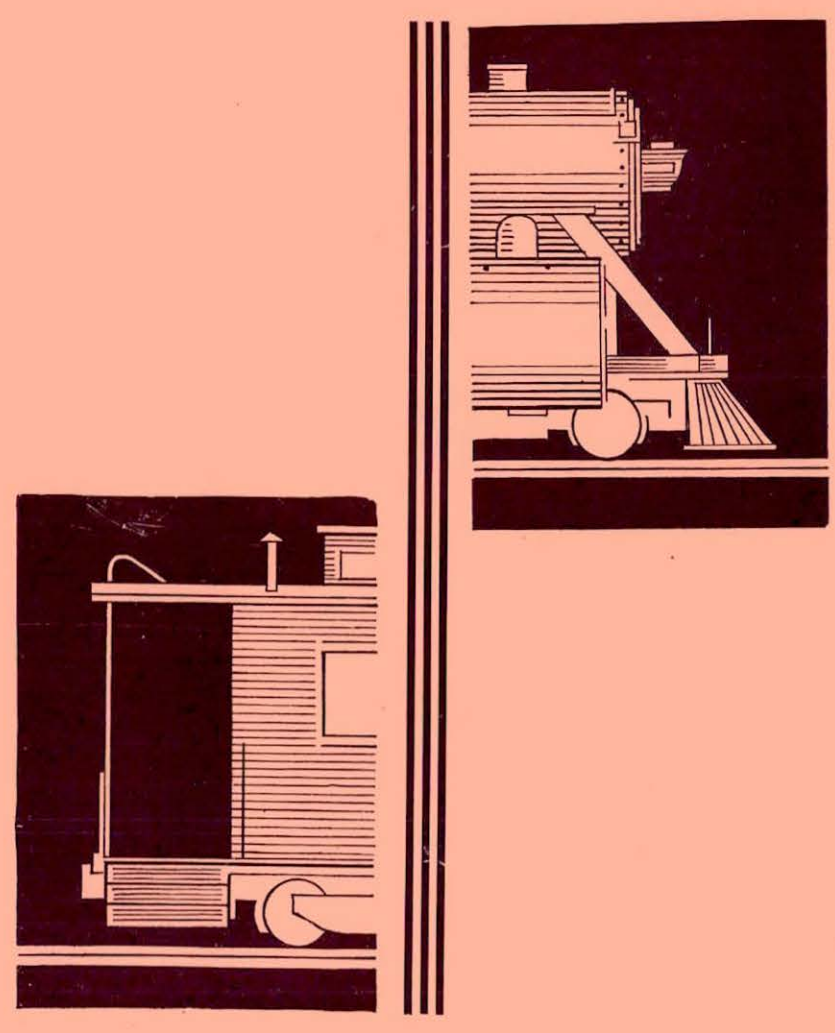
From Locomotive to Caboose



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"The first installation of this revolutionary method of directing train movements by signal indication over an entire division without train orders was placed in service in 1927. Other installations followed as the advantages of this system were demonstrated, but further progress was halted by the depression.

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"By reverting to single-track operation it would be possible to save at least $1,000 per mile annually in the maintenance of one track. Where rail and tie renewals are far behind schedule, the abandonment of a track would effect even larger reductions in current outlay if action were taken now. The money that would be required to rehabilitate the track taken out of service would go far in paying for the centralized traffic control.

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"There are thus several reasons for immediate investigations of the possibilities of centralized traffic control on many sections of railroad."

* Editorial from the Railway Age of June 17, 1933.

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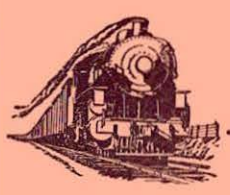

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